

UNIVERSITY OF TORONTO



REPORT OF THE DEAN  
OF THE  
FACULTY OF MEDICINE

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Report of the Dean of the Faculty of Medicine



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## THE DEAN OF THE FACULTY OF MEDICINE

At a time when there is widespread unrest among university students it is imperative that we examine the causes of and seek remedies for the justifiable dissatisfactions. The President has spoken on this subject on numerous occasions.

In the professional faculties, especially Medicine, the goal is possibly more clearly defined than in the humanities. The student in a professional course may complain that some of his instruction appears irrelevant. In this respect he is at variance with students in the Arts' faculties who complain that the University is only concerned with turning out stereotyped members for society's establishment, while offering little freedom to the individual to explore avenues of personal interest.

It is a hard fact of science that meandering leisurely through the meadows of knowledge, sniffing at the daisies of intellectual curiosity while ignoring the thistles of demands for all forms of service, cannot produce the disciplined individual essential to the practice of medicine.

The members of the academic body as a whole may be so preoccupied with personalized research that they ignore the reality of community need. But can a university continue to exist if it deals only with intellectual irrelevancies and fails to concern itself with the pressing demands of society?

No one disputes the necessity for scholarship for scholarship's sake, but has not a university a broader responsibility? If it has, and this responsibility is not met, then extensive technical and professional institutes will have to be established to provide the highly trained and scientifically competent individuals who understand the immutable laws of nature and are willing to adapt them to the service of society.

To provide a balance between pure scholarship with academic excellence, and professional and applied scientific scholarship, is one of the major problems facing the universities and in particular their medical faculties today. To quote from an article by Paul J. Sanazaro, formerly Director of Education, Association of American Medical Colleges:

"We must remind ourselves that medicine brought on this dilemma by its wisdom in adopting a base of productive, scientific research. It has kept its promise of becoming an ever more educated profession. In achieving this objective, it has become increasingly dependent upon an expensive education and technology which cannot be financed in the traditional manner. As a consequence, medicine must now engage in a continuous bargaining with its public, through government. This context and, more importantly, the circumstances accounting for it, must be understood if we wish rationally to analyze the emerging patterns in medical education ...

"First, medical education must more explicitly direct its educational and research goals and functions to the medical care needs of society. As a corollary, education in college and medical school, training in internship and residency, and continuing education must be planned, co-ordinated, and conducted as a continuum. Second, medical schools and universities must regroup their resources and direct them within appropriate academic limitations, to devising and testing new means of delivering medical care. The public is demanding another miracle of medicine: an effective antidote to the splintering of patient care. In our search for this touchstone, the principles of comprehensive care must be operationally defined and effectively incorporated into the education of all physicians. As a further corollary, the physicians of the future are to be responsible for the health of communities as well as the health of individuals within these communities. To provide these physicians with a base of scientific understanding, medical schools and universities must define, in acceptable academic terms, the substance and the bounds of community medicine ...

"The traditional medical school organization was laid down when its sole



function was to train undergraduate medical students. Today medical centres are multimillion dollar enterprises in which expenditures for research, graduate education and residency training far exceed expenditures for undergraduate education. The first four years of medical education is today but one of many programmes in the medical center, and it no longer commands the prime time of the full-time faculty, neither pre-clinical nor clinical. Administrative reorganization is a foregone necessity ..."

For this reason a thorough look at the relationship existing between the Medical School, the teaching hospitals, the university administration and government has been instituted by the Board of Governors. A group of medical educators have spent many hours with the Vice-President (Health Sciences), the Dean and members of the Faculty and hospital representatives seeking to provide impartial answers to many of our complex problems for achieving our educational goals at a supportable cost and with organizational efficiency.

Since nearly all plans for expansion of facilities for clinical instruction in the teaching hospitals have had to await the development of a comprehensive, co-ordinated, and University-approved plan (a recently imposed government requirement) the completion of such a plan is an urgent necessity and is awaited with impatience by the Faculty, the hospitals and the government. The fact that this plan may not coincide with the aspirations of some of the member institutions has been a source of anxiety and apprehension to many. It has pointed up one of the major weaknesses in university organization, namely the slow-moving, inadequate machinery for dealing expeditiously with urgent community needs which can only be met by university co-operation and participation. If the University continues to aspire to give leadership in the field of Health Education it must be prepared to react quickly and appropriately to community requirements while maintaining its high standard of academic excellence.

Having dealt with some of the negative characteristics of our situation, it is a pleasure to note many positive advances.

The construction of our Medical Sciences Building, which was delayed by strikes last year, has progressed so rapidly that we shall be moving into the East Tower this summer, six to eight months ahead of schedule.

The old Medical Building will be demolished in August to make way for the auditorium, and if the present pace is maintained the whole complex will be completed by September 1969.

Another plus in our activities was the acceptance of the feasibility of a new curriculum based on teaching by bodily systems rather than by departmental disciplines. The enormous amount of time and effort expended by Faculty members on various systems committees is a most heartening reassurance of the personal concern of each member of the Faculty to provide a practical as well as an excellent curriculum. Special mention should be made of the Period Co-ordinators: Dr. Sellers (Period I), Dr. Laidlaw (Period II), Dr. Watters (Period III) and Dr. Morch (Electives). It is hoped that the syllabus, time-tables and examination procedures will be ready for Senate approval early in the next academic year.

In the area of clinical postgraduate education, programmes for specialty training have been delineated, including the appropriate numbers of staff members and students by department and hospital. Forecasts of teaching and research space required in the Medical School and its affiliated hospitals by the expanded enrolment have been made. This is a new dimension of University responsibility and one which has been only vaguely defined in the past. It will comprise a very major portion of Faculty activity. A satisfactory resolution of all our obligations in this field is our chief concern of the moment. A special committee made up of members of the Board of Governors and Faculty is studying the problem.

Internal organization within the Faculty has received attention. At a two-day retreat of Department Heads, there was a fruitful exchange of ideas and information.



Resolutions were passed which are expected to lead to effective operational procedures to ensure the close support of the programme by the administrative resources of the Faculty.

In association with the Deans of the other Medical Schools in Ontario consideration was given to the means of providing for the financial assistance to final-year students who will be required to spend 12 months in a clinical clerkship. That the unit value ascribed to medical students under the system of formula financing falls far short of the needs of our faculties is causing concern. Clinical, bedside, and outpatient teaching requires one instructor to a maximum of four or five students, a ratio close to that for graduate students who are ascribed a unit value of six at the P.H.D. level, while medical students are rated at three. Consideration has also been given to the complexity of financing clinical staff and the possible effect of universal health insurance on educational programmes.

Turning now from general to some specific areas we are happy to say that Professor Irving Fritz of Ann Arbor has accepted the Chairmanship of the Banting and Best Department of Medical Research.

Dr. Robin Badgley has accepted the Directorship of the new Division of Behavioural Science.

Dr. L. R. Christensen has filled a greatly needed position as Director of the Division of Laboratory Animal Science.

Dr. N. Swanson has been appointed Director of Audio-Visual Facilities.

Dr. Robert Julius is Director of Medical Computing Facilities for the Faculty.

We regret to announce Dr. E. Sellers' resignation as Associate Dean, Basic Sciences, to return to a professorship in Pharmacology. The Faculty is grateful for his thoughtful attention to their problems.

Dr. Philip Greey, Chairman of the Department of Bacteriology, retires from his post this year. Dr. Franklin has been appointed Acting-Head.

The inclusion of student representatives in many Faculty committees and on the Council has been beneficial to all concerned.

Finally, I should like to thank all those who by their donations have so generously supported our fellowship, scholarship and research programmes.

#### RESEARCH

Abbott Laboratories Limited; Alcoholism and Drug Addiction Foundation; American Medical Association; The Atkinson Charitable Foundation; Ayerst McKenna Harrison; Banting Research Foundation; J. P. Bickell Foundation; British Drug Houses; Burroughs, Wellcome and Company; Canadian Arthritis and Rheumatism Society; Canadian Cystic Fibrosis Association; Canadian Diabetic Association; Canadian Foundation for Advancement of Therapeutics; Canadian Heart Foundation; Canadian Life Insurance Officers' Association; C.I.B.A. Foundation; The Commonwealth Fund; The Connaught Medical Research Laboratories; The James H. Cummings Foundation; Cyanamid of Canada Limited; The Defence Research Board; Department of Health (Provincial); Department of National Health and Welfare; Dominion Stores Limited; Eaton Endowment Account; James Franceschini Foundation; Lederle Foundation; R. Samuel McLaughlin Foundation; John and Mary Markle Foundation; Medical Research Council of Canada; Multiple Sclerosis Society; Muscular Dystrophy Association of Canada; National Cancer Institute; National Research Council of Canada; National Sanitarium Association; Ontario Cancer Treatment and Research Foundation; Ontario Heart Foundation; Ontario Mental Health Foundation; Ontario Society for Crippled Children; Ontario Tuberculosis Association (Ontario Thoracic Society); Poulenc Limited; Queen Elizabeth II Canadian Fund; Rehabilitation Fund for the Disabled; Rockefeller Foundation; Rubin Corporation; Schering Corporation Limited; Syntex Limited; United States Army Medical Research & Development Command; United States National Institutes of Health; Warner Lambert Research Institute of Canada; Wynola Corporation.



*Visitors*

During the academic session many prominent physicians and scientists visited the Faculty. These included:

*Department of Anaesthesia:* Professor Edmond I. Eger II, University of California, San Francisco, who gave the Ninth Dr. Harry Shields Lecture; Dr. W. N. Rollason, Aberdeen; Dr. Thomas W. Baillie, Dumfries; Dr. Emerson Moffitt, Mayo Clinic, Rochester, Minnesota; Dr. Russell Cole, Melbourne; Dr. Ian Geddes, Liverpool; Dr. Cedric Prys-Roberts, Oxford; Professor Ole Secher, Copenhagen.

*Department of Art as Applied to Medicine:* Mr. Robert Demarest, New York.

*Department of Medicine:* Professor Jan Brod, Prague; Professor Lucien Brumpt, Paris; Dr. B. Clarkson, New York; Dr. J. V. Dacie, London; Dr. Z. Dubienski, London; Dr. W. K. Engel, Bethesda, Maryland; Dr. C. E. Ford, Berkshire, England; Dr. J. Goodwin, London; Dr. D. Hamer, London; Dr. G. Hawton, Manchester; Dr. Harley, Halton; Dr. J. Hay, Montreal; Dr. G. Howitt, Manchester; Professor D. Hioco, Paris; Dr. J. E. Howard, Baltimore, Maryland; Dr. M. Kuxerz, Prague; Dr. S. Lee, Edmonton; Dr. G. Loewi, Taplow, England; Dr. M. Matthews, Edinburgh; Dr. G. Miller, Madison, Wisconsin; Dr. G. A. H. Miller, London; Professor Henry Miller, Newcastle, England; Dr. R. Rohmer, Sweden; Dr. Slade, British Columbia; Dr. G. Sloman, Melbourne; Dr. P. K. Thomas, London; Dr. J. Vaughan, Rochester, New York; Dr. W. Wrong, London; Dr. R. Young, St. John's, Newfoundland.

*Department of Obstetrics and Gynaecology:* Professor J. H. M. Pinkerton, Belfast; Mr. W. R. Winterton, London; Dr. J. D. Woodruff, Baltimore, Maryland; Dr. Clyde Randall, Buffalo, New York; Dr. J. C. S. Spry-Leverton, England; Dr. J. A. Chalmers, Worcester, England; Professor Lance Townsend, Melbourne; Dr. Mary Coyle, Dundee.

*Department of Ophthalmology:* Dr. Alfred J. Elliot, British Columbia, who gave the Tenth Walter Wright Lecture; Professor C. I. Phillips, Manchester; Dr. S. M. Drance, British Columbia; Dr. David D. Donaldson, Harvard University; Dr. Herbert E. Kaufman, Gainesville, Florida; Dr. W. K. Noell, Buffalo, New York; Dr. C. R. Braekevelt, London, Ontario; Dr. R. Cosentino, Buffalo, New York.

*Department of Otolaryngology:* Professor John Bordley, Johns Hopkins University; Professor George Reed, New York; Professor I. Friedmann, London.

*Department of Paediatrics:* Dr. David G. Nathan, Boston; Dr. Barbara Ansell, Taplow, England; Dr. Frederic N. Silverman, Cincinnati; Professor Ettore Rossi, Bern; Professor Otto Wolfe, London; Dr. Colin Forbes, Lagos, Nigeria; Dr. O. Ransome-Kuti, Lagos, Nigeria; Dr. Tom Stapleton, Sydney; Dr. José Ramirez, Baltimore, Maryland; Dr. Alf Backman, Helsinki; Dr. Divak Pongpipat, Bangkok; Dr. Espino-Vela, Mexico; Dr. Elizabeth Wilmot, Melbourne; Dr. Robert Southby, Melbourne; Dr. N. Hale, Cambridge, England; Dr. Alice Bush, Auckland; Dr. V. L. Collins, Melbourne; Dr. A. Nisonoff, Chicago; Professor M. Verstraete, Louvain, Belgium; Dr. Murray Davidson, New York; Dr. Hung, Taipei.

*Department of Pathological Chemistry:* Dr. Morris Kates, NRC, Ottawa; Dr. K. M. Anderson, Chicago.

*Department of Pathology:* Dr. Basil Morson, London; Professor Christian deDuve, Brussels and New York; Dr. Jeorh Jensen, Miami; Dr. William Mair, London; Dr. Peter Thomas, London; Dr. King Engle, Bethesda, Maryland; Professor I. Friedmann, London; Dr. G. Loewi, Taplow, England; Dr. Hugh Starkey, Montreal; Dr. Robert Wissler, Chicago; Dr. A. G. Sanders, Oxford; Dr. K. Ishizaka, Denver; Dr. Peter Ward, Washington; Dr. D. C. Gajdusek, Bethesda, Maryland.

*Department of Pharmacology:* Dr. P. Stern, Sarajevo, Yugoslavia; Dr. L. Spero, New York; Dr. A. S. V. Burgen, Cambridge, England; Dr. M. P. Earles, London; Dr. Ian Geddes, Liverpool; Dr. C. C. Gale, Seattle; Dr. H. Blaschko, Oxford.

*Department of Physiology:* Dr. Iain MacIntyre, London; Dr. C. A. Goresky, Montreal; Dr. Walton W. Shreeve, Brookhaven National Laboratory; Dr. J. J. Hoet, Louvain, Belgium; Dr. Hans-Dieter Söling, Göttingen, West Germany; Dr. E. M.



Renkin, North Carolina; Dr. B. Pomeranz, Massachusetts; Dr. B. Issekutz, Dalhousie University; Dr. J. H. Dirks, Montreal; Dr. K. Krnjevic, McGill University; Dr. R. M. Preshaw, Mayo Clinic; Dr. D. S. Kronfeld, Pennsylvania; Dr. J. S. Beck, Minnesota; Dr. J. Grayson, Alberta; Dr. J. A. F. Stevenson, London, Ontario; Sir David Cuthbertson, Glasgow; Dr. J. M. Frederickson, Stanford University of Medicine; Dr. N. S. Track, London.

*Department of Psychiatry:* Dr. Jules H. Masserman, Northwestern University; Dr. Ian Gregory, Ohio State University; Dr. Lawrence Kolb, New York.

*Department of Radiology (Diagnostic Radiology):* Dr. Paul Roy, Montreal; Dr. Thomas F. Meaney, Cleveland Clinic; Dr. Shura Holesh, London; Dr. Osamu Ishida, Osaka, Japan; Dr. Sidney W. Nelson, Ohio State University; Dr. E. A. MacLaughlin, Newfoundland; Dr. N. Snijder, Geldrop (Eindhoven, Holland); Dr. S. Oksaner, Helsinki; Dr. E. Tahti, Helsinki; Professor Kurt Decker, Munich; Dr. Fred Silverman, University of Cincinnati; Dr. J. S. Dunbar, McGill University.

*Ontario Cancer Institute:* Dr. Nadejda Greigorieva, Moscow; Dr. Natalia Vorobieva, Moscow; Dr. Ernst Gottinger, Linz, Austria; Captain Khin Maung Ky, Burma; Dr. W. Urquhart, Palmerston North Hospital, New Zealand; H. R. H. Princess Margaret; The Earl of Snowdon; Dr. Simon Kramer, Philadelphia; Dr. V. P. Collins, Houston, Texas; Dr. John Hayward, London; Dr. M. Bulbrook, London; Dr. John C. Pugh, London; Dr. Sigvard Kaae, Aarhus, Denmark; Dr. J. S. Pearson, Edinburgh; Dr. W. F. White, London; Dr. Philip Corlette, Sydney; Dr. G. G. Germann, Melbourne; Dr. Jean-Pierre Wolff, Seine, France; Dr. P. Thomas, Leiden; Dr. Graham Sopsford, Brisbane.

*Department of Surgery:* Dr. Paul Baj, Mexico City; Dr. W. T. Barnes, Danville, Pennsylvania; Mr. Ronald Belsey, Bristol; Dr. John Dark, Manchester; Dr. William S. Dye, Chicago; Dr. S. H. Farrell, Wales; Dr. F. S. Gerbasi, Detroit; Dr. S. Holesh, London; Dr. Brian Johnstone, Fort Francis, Ontario; Dr. M. Kucera, Prague; Dr. Richard Lenerhefer, Vienna; Dr. W. D. MacDonald, Calgary; Dr. André McClish, Quebec City; Dr. Owen W. Miller, Columbia, Maine; Dr. Emerson Moffitt, Rochester, Minnesota; Dr. E. A. Osius, Detroit; Dr. G. B. Parulkar, Bombay; Dr. Shigeru Sakakibarga, Tokyo; Dr. J. A. Simpson, Perth, Australia; Dr. S. Singh, Edmonton; Dr. R. E. Taber, Detroit; Dr. L. D. Wilcox, London, Ontario; Dr. S. W. Winslow, Battle Creek, Michigan; Dr. J. A. Witter, Detroit; Dr. Liebermann Yair, Israel; Professor Zudiasz, Budapest; Professor John H. Davis, Cleveland; Dr. Adrian Marston, London; Dr. John E. McBirnie, Port Colborne, Ontario; Professor Wm. V. McDermott, Boston; Dr. Basil Morson, London; Professor Paul Schloerb, University of Kansas; Dr. Roy Selby, Kuala Lumpur, Malaysia; Dr. Y. Sunami, Okayama, Japan; Dr. Norman Cecil Tanner, McLaughlin-Gallie Visiting Professor, London; Mr. Lawrance Wade, James IV Visitor, Cardiff; Dr. B. J. Dooley, Melbourne; Dr. M. A. R. Freeman, London Hospital Medical College; Dr. A. N. Henry, London; Dr. W. M. McQuillan, Edinburgh; Dr. A. R. McKenzie, Otago, New Zealand; Dr. Mraim McKibbin, Sheffield; Dr. C. L. Greaves and Dr. J. B. Maloney, Sydney; Professor Carl Hirsch, Göteborg; Professor A. R. Hodgson, Hong Kong; Dr. Jennifer Jowsey, Rochester, Minnesota; Mr. Kingsmill-Moore, London; Dr. Ross Nicholson, New Zealand; Dr. Peter Williams and Dr. Keith Daymond, Australia; Dr. Claude Bertrand, Montreal; Dr. Kevin Bleasel, Sydney; Dr. B. H. Dawson, Salford, England; Dr. Joel Guelmann, Rio de Janeiro; Dr. Antony Jefferson, Sheffield; Dr. Alan Kerr, Liverpool; Dr. Keith Langford, Melbourne; Dr. Charles Langmaid, Cardiff; Dr. Jean Lecuire, Lyon, France; Dr. Andrew Masson, University of the West Indies, Jamaica; Dr. A. Paterson, Killearn, Scotland; Dr. John Potter, Oxford; Dr. J. M. Small, Birmingham; Dr. S. K. Wang, Taiwan; Dr. M. L. Wheatley, Parry Sound, Ontario; Dr. John D. Yeo, Sydney; Dr. Thomas Gibson, Paisley, Scotland; Dr. I. F. K. Muir, Middlesex, England; Dr. John C. Mustarde, Glasgow; Dr. Roger C. B. Pugh, London; Dr. Romando Trabucco, Buenos Aires; Dr. David M. Wallace, London; Dr. Turner Warwick, London.

A. L. CHUTE



## DIVISION OF POSTGRADUATE MEDICAL EDUCATION

*Under the direction of Professor R. Ian Macdonald*

Postgraduate medical education in Toronto is at a critical stage in its evolution for it must adapt, in concert with all phases of medical education, to meet the needs of today's rapidly changing environment. The fortunate combination of resources offering the potential to achieve the first rate impels it; the high quality and aspirations of our students demand it; and the public and government alike hope that it will achieve their expectations of abundant health.

Because of the nature and purposes of medicine and the phenomenal increase in its usefulness to humanity, the violent interaction of scientific, technological, economic, social and political forces altering our lives and attitudes have made more impact on it than on most disciplines within the universities. Radically new conditions for the learning and practice of medicine have been created; and community planning for health and the delivery of health care have taken on a new significance.

As a consequence, medical schools are challenged by exceptional, if not unprecedented problems, both in developing plans to modernize and streamline the educational process and in devising means to ensure orderly implementation and continuing review.

The nature of medicine is such that it must meld science, which can be quantified, with art and a multitude of human factors, which cannot. This is a formidable challenge for medical education; but it must be met successfully if we are to ensure that the beneficial lever of scientific medicine attains its full power through proper placing of the fulcrum of human understanding.

The first requirement in planning change is, of course, to establish educational objectives which are clear to all those within and without the faculty who have any responsibility for their execution and co-ordination. Objectives must be based upon an understanding of the purposes of medicine and on a realistic assessment of the legitimate needs which a medical school today can be expected to meet and of its resources, or potential resources, to do so.

Perhaps it can be accepted that the main purposes of medicine are to promote health, to relieve suffering and to "search out and study the secrets of nature by way of experiment." If this be so, the objectives of medical schools must be to educate students for careers of professional responsibility and service, to provide for the education and development of teachers who have the will and capacity to communicate and stimulate, to foster scientists and scholars interested in advancing knowledge, and to provide the intellectual atmosphere which stimulates learning, research and the dissemination of knowledge.

Attention is directed to the word "service" for almost imperceptibly it has become disreputable in some academic circles in North America. Indeed there is a risk that it may become so here because of financial problems in *separating* the costs of teaching and "service"! This separation can create bad attitudes in both staff and students for it tends to obscure the fact that first-rate education in the clinical sciences cannot be carried on in the absence of a learning environment organized to provide first-rate care of the sick. Another unfortunate effect is that teachers who belittle "service" cannot possibly inculcate students with the ethos of medicine which is more important than ever in the present confused state of the world. Medical teachers and the government and people of Ontario should be vigilant in insisting that service retain its traditionally honourable meaning.

The objectives advocated can be attained only through an appropriate curriculum. This is an area in which there is bound to be controversy no less acute than when Thomas Hodgkin proposed reforms in the medical curriculum at Guy's Hospital in 1827. This happens because there are varying judgments about what is appropriate. Flexner's ideas enunciated over half a century ago are perhaps still relevant if they are modified to meet today's conditions and if their execution is improved through



our increased knowledge of the learning process. A student at graduation should have a broad general education; a good grounding in the sciences on which medicine is based; an acceptable fund of factual knowledge and a great deal of understanding about what it is all about. Hopefully he will not have been bored to death and drained of the capacity of imaginative thought through having been over-stuffed with facts; and he will have discovered how to learn. The new curriculum of this school seems ideally adapted to enable optimum development of a student's talents and interest. One should expect the education process to flow smoothly into the postgraduate phases. Arrangements for these phases must be flexible enough to provide for the many career paths open in medicine today. There should be a constant awareness of the need to conserve time and of the fallacy of equating the quality of a programme with its length.

Few faculties in this University have 100 per cent of their graduates enrol for postgraduate study. Fewer still are expected to educate over four, five or more years as high a proportion of their graduates as does the Faculty of Medicine. Increasing numbers of graduates from other schools in Canada and abroad add to this educational responsibility. It is true that a good deal of this is carried on in hospitals affiliated with the University; but as university staff, money and reputation are involved, it is clearly regarded by the public and the profession as a university responsibility. Happily, too, the misconception that this is a period devoted solely to learning the skills, techniques and art of the "trade" is dying out. The study of man in health and disease, and learning how to direct science through art, is an educational exercise of substantial respectability.

It is appropriate to recall that Toronto has become an important centre for postgraduate medical education largely through the thought and efforts, over many years, of successive departmental chairmen and their interested colleagues. During this period the basic science departments have had full university support and recognition through the School of Graduate Studies. As their students were proceeding to higher degrees in the University, they were accepted as "graduates" and a significant proportion of them became eligible for financial aid. The clinical departments developed their programmes with the support of the Faculty and of different hospital administrations. Their students were designated as postgraduate students. Time has cancelled the financial imbalances of this terminology; but the academic implications still apply. It is to be hoped that the establishment of the Institute of Medical Science will provide at least partial remedies.

When the Royal College of Physicians and Surgeons of Canada established high standards in the clinical sciences, medical schools adjusted and expanded their programmes to allow their students to qualify. This has had a profound effect on the volume and standards of education and on the quality of medical care in Canada. The programmes in the different departments of this school have become so large that the campus, in effect, has been extended to a number of hospitals whose educational facilities are being used fully or in part by university teachers. Students enrol in the natural expectation that the educational opportunities in one hospital are of equal quality to those in the other hospitals associated with the programme. However, some of these institutions may not be able to organize a learning environment of sufficiently high quality and this points up the need for departmental chairmen to be given all the university support required to meet their legitimate educational aspirations. The time has also come to establish realistic co-ordination in admission procedures and uniformity in standards as well as in educational objectives and quality. This has been done in some departments through the institution of Diploma Courses with beneficial results, not only in a more careful selection of candidates but also in the raising of educational standards resulting in an improvement in the quality of the graduates. A new Diploma in Clinical Chemistry has been approved for the next session and the Faculty Council has recommended for consideration by the Senate Committee on Diplomas the establishment of Diplomas in Ophthalmic Science and in Medicine. The total number of postgraduate students who can be



provided with proper education in this school could not be determined without a careful assessment of all the factors involved and a resolute decision of Faculty Council to approve only those programmes which are of acceptable educational standards.

The Faculty Council expressed its interest in the Division by recommending that a small committee be set up to review its organization and policies. It is hoped that the committee will not become becalmed in an enervating Sargasso Sea of statistics and sub-committee reports. Attention will also be directed to considering the desirability of continuing with the Advanced Graduate Courses in Medicine, Surgery and Obstetrics and Gynaecology, which have had a popular appeal for over twenty years.

During the session under review, the work of the Division continued to increase as has been the case since its inception. It had become increasingly obvious that the designation "Secretary of the Division" could not accurately describe Mrs. Flinn's responsibilities and the appropriate title of "Programme Director" has replaced it. As the Division is an earning one, there is a good deal of financial administration in addition to supervising the work in the office and co-ordinating the arrangements for both intramural and extramural programmes in continuing education. It became necessary during the year to add a full-time secretarial assistant and to employ more part-time help than previously. Despite this, the staff had to work diligently to keep up with the routine flow of work and very frequently had to labour under crisis conditions to meet deadlines of various sorts. Their continuing interest and competent work is gratefully acknowledged. Mrs. Helen Leslie retired from her part-time appointment at the end of the session.

During the session Dr. J. O. Godden joined the Division on a part-time basis. His experience in clinical medicine, in medical education and in medical communication should improve the services available from the Division.

The first postgraduate programmes of the session were the Advanced Graduate Courses in Medicine, Surgery and Obstetrics and Gynaecology which extended over a five-week period during the summer. Teachers were drawn not only from the clinical departments primarily responsible for the programmes but also from other clinical departments and basic science departments. This major co-operative effort of the Faculty has been carried on annually for some twenty years and there can be no doubt that it has met the particular needs of the groups for whom it has been specially organized. Ninety-seven students registered and while the majority of these had just finished their formal postgraduate education, there were some who had been in practice for a number of years and who wished to revise old knowledge and bring it up-to-date. Fifty-five of the candidates came from outside the Toronto area.

On September 14, 15 and 16, 1968, an invitation conference on "The Use of Audio-Visual Aids in Medical Teaching – Problems and Resources" was held at the Inn on the Park and Scarborough College in conjunction with the Canadian and Ontario Medical Associations and with the collaboration of Dean Beckel and his staff. Drs. Norrie Swanson and Jan Steiner were responsible for planning the programme and for selecting the guest faculty; Dean Beckel and Mr. Harry Davis of Scarborough College took an active part both in planning and in execution. The necessary financing was arranged by the Canadian Medical Association and through the generosity of Geigy Pharmaceuticals. This was a truly co-operative venture providing a forum for the exchange of ideas and experience in the developing field of audio-visual communication. Every medical school in Canada was invited to send representatives; there were also representatives from provincial and federal governments as well as the sponsoring societies and our own Faculty. The subject matter was considered of sufficient importance to warrant a special edition of the *Canadian Medical Association Journal* for which Dr. Godden assumed editorial responsibility. Reprints of this issue have subsequently been in great demand.

Another co-operative venture was the Course in Fractures and Associated Trauma on March 14, 15 and 16. This annual course, offered by the Division of Orthopaedic



Surgery with the co-operation of the Workmen's Compensation Board of Ontario was very successful. Two hundred and twenty-seven registered and a distinguished guest faculty collaborated with our surgical staff. The support, administrative help and advice of the Board and its Chief Medical Officer and staff is acknowledged with gratitude.

The imaginative idea of offering a Refresher Course for Women Doctors originated with the Preceptorship Committee of the Ontario Federation of Medical Women. It was directed to women who had dropped out of practice but who might be encouraged to return. The Department of Health of Ontario took a keen interest and offered bursaries for those who completed the course. Extensive planning was involved after Dr. Adelaide Fleming and Dr. Ruth Kurdyak of the Federation of Medical Women had confirmed interest through a questionnaire. The Division itself circulated a questionnaire to preliminary registrants in order to identify areas of interest. The clinical sessions (about half of the three-week course) were arranged to meet individual needs as closely as possible and were held for small groups of two and three in a number of departments of various affiliated hospitals. The home base for the course was the Women's College Hospital whose staff and administration took a keen interest and offered every assistance. Twenty-six women registered for the course which extended from February 12 to March 1. A paper by Dr. Godden describing the course appeared in *The Medical Graduate*, University of Toronto, April, 1968.

Registrations in the Division during the session totalled 2,120. Of these 103 were enrolled in Diploma Courses, 58 were in Sessional Courses, 20 were in the B.Sc. (Med.) Course, 373 were receiving their education in one or other of the hospitals affiliated with the University, 18 were Colombo Plan or occasional students, 97 attended the Advanced Graduate courses and 1,451 doctors in practice registered for one or more of the 30 special short intramural courses offered through the Division by different departments in the Faculty either singly or in collaboration.

As in previous years, the extramural "travelling" clinics held in different centres in Ontario seemed to fulfil the objectives for which they had been organized. As formal registration has never been required for these, accurate attendance figures are not available. However, a conservative estimate would set the attendance during the year at approximately 1,000.

During the session the Director served as university representative on the Council of the College of Physicians and Surgeons of Ontario and the Medical Council of Canada and continued to be a member of the Ontario Council of Health.

#### SCHOLARLY ADDRESSES

R. IAN MACDONALD, "The Problem of the Care of the Aged," Hamilton Geriatric Foundation; "Right Thinking in the Care of Older People," Annual Meeting, Saskatchewan Division of the Canadian Medical Association; "Postgraduate Medical Education," Section of Medicine, Saskatchewan Division, the Canadian Medical Association.

J. O. GODDEN, "The New Curriculum," Ontario Institute for Studies in Education, Toronto; "Efficient Evangelisms in Family Medicine," Conference on Continuing Medical Education, American Academy of General Practice, Kansas City.

## DIVISION OF REHABILITATION MEDICINE

*Under the direction of Professor A. T. Jousse*

The main concern of the Department during the current year has been the procurement of appropriate personnel to replace the directors of the Divisions of Rehabilitation Medicine at Sunnybrook Hospital and the Toronto General Hospital. As yet suitable incumbents have not been forthcoming.



Plans for the building of the new paraplegic hospital adjacent to Sunnybrook Hospital are being developed in co-operation with the appropriate representatives of the Ontario Hospital Services Commission.

Four physicians are proceeding with training programmes which will qualify them to write the Certification or Fellowship examinations of the Royal College of Physicians and Surgeons of Canada. One of the four is from Thailand, and will return to her homeland when her training has been completed.

At graduation this year 89 graduated in Physical and Occupational Therapy, two received their Diplomas as teachers of Physical Therapy and fourteen were graduated in Speech Pathology and Audiology. One received a Teacher's Diploma in O.T.

The Rehabilitation Unit located at the Princess Margaret Hospital Lodge continues to provide service for persons disfigured by cancer of the head and neck. In addition, one trainee is nearing the end of her apprenticeship as a prosthetic technician. A scientific display featuring the work of the Department was mounted for the meeting of the Royal College of Physicians and Surgeons of Canada at the annual meeting in Toronto.

At the Wellesley Hospital a pilot programme for the treatment of children with perceptual handicaps has been initiated and will be carried on for at least a year.

At Sunnybrook Hospital a programme for post-coronary rehabilitation has been organized. The programmes at Sunnybrook, the Wellesley and the Princess Margaret Hospitals have been directed by Dr. C. M. Godfrey.

Three postgraduate programmes have been held during the past year in association with the Division of Postgraduate Medical Education. Included was a course in Manipulative Medicine, one in Speech Pathology and Audiology and one for Physical Therapists.

At the Toronto Western Hospital Dr. Crawford and his associates, Dr. Renaud and Dr. Franks, have continued to provide exemplary patient care, to offer teaching programmes for medical students and therapists, and have carried out research.

With the retirement of Miss Helen Levesconte June 30, 1967, her place was taken by Miss Isabel Robinson, who thus became Assistant Professor in the Division of Rehabilitation Medicine and senior teacher of Occupational Therapy.

At the same time Miss Lilian Pollard retired from the post of Senior Lecturer in Physical Therapy and Miss Bradshaw assumed her position with the rank of Assistant Professor.

Miss Levesconte and Miss Pollard had rendered constructive and inspired service over many years and were mainly responsible for the development of educational programmes for the training of Physical and Occupational Therapists in Canada.

They built truly and well, and not the least of their accomplishments has been in the provision of such able successors to their positions in the persons of Miss Robinson and Miss Bradshaw. In addition to performing teaching duties, each assumes responsibility for organizational duties in their respective national and international professional organizations.

## RESEARCH

The following projects are under intensive study at Sunnybrook Hospital, the Wellesley Hospital and Princess Margaret Lodge. The results of the research are not yet ready for reporting:

"An Investigation of Walking Characteristics of the Sach Foot"; "Weight-bearing as a Means of Shaping Orthotic Foot Devices"; "Median Nerve Motor Conduction Delays in Colles Fractures"; "The Prosthetic Blinking Eye"; "An Intraoral Voice Generator for Alaryngeal Patients"; "Intramuscular Electrode Stimulation for Paretic Arms"; "A Hand Brace for Rheumatoid Patients."

At the Toronto Western Hospital research is being conducted by Dr. Franks to evaluate the influence of oral zinc sulfate in the healing of pressure sores in geriatric patients.



Further study is being conducted in the incidence of urinary tract infections in geriatric patients. In collaboration with Dr. Reynolds and Dr. Wiley electromyographic studies have been made on the rheumatoid arthritic hand.

Dr. Renaud reports that at long last the research on post-prostatectomy urinary incontinence is bearing fruit.

Dr. Geisler has completed a study at Lyndhurst Lodge on the incidence of infection-free urine in the bladder of paraplegics and paraparetic patients. The resulting paper will be presented at the 5th International Congress of Physical Medicine and Rehabilitation in Montreal in August, 1969.

During the past year, as well, a follow-up study of Life Expectancy and Mortality in Traumatic Transverse Myelitis has been completed.

#### HONOURS

J. S. CRAWFORD has been appointed to the Canadian Board of Prosthetists and Orthotists as Chairman of the Committee on Credentials and Examinations. He has also been appointed a member of a Task Force Committee by the Minister of Health of the Province of Ontario, the purpose of the Committee being to survey the current trends in Rehabilitation Care in the province and to advise regarding future trends.

W. M. FRANKS was recently elected Chairman of the Section of Physical Medicine and Rehabilitation of the O.M.A.

CHARLES M. GODFREY: Chairman of the Section of Physical Medicine and Rehabilitation, the Ontario Medical Association; Chairman and Curator of the History of Medicine Museum, Academy of Medicine and Member of the Council, Academy of Medicine; Visiting Professor of Rehabilitation Medicine, University of Tunis, Tunisia (January, 1968); Centennial Medal Award; appointed Chairman of the Committee on Physical Fitness, Ontario Heart Foundation.

A. T. JOUSSE: Centennial Medal Award.

#### SCHOLARLY ADDRESSES

J. S. CRAWFORD, "A Practical Approach to the Treatment of the Arthritic Patient," the Stratford General Hospital Medical Staff, autumn 1967; "Rehabilitation of the Hemiplegic Patient," Refresher Course for General Practitioners, spring, 1968.

C. M. GODFREY, "Symposium on Assessment and Treatment of Rheumatoid Disease," May 2, 1968, Canadian Arthritis and Rheumatism Society; "Rehabilitation, Prospect and Retrospect," 11th Annual Symposium on Rehabilitation (The Rehabilitation Foundation for the Disabled), October 21, 1967; "The Care of the Chronically Ill and Elderly Patient," Seminar, Peterborough Civic Hospital, February 7, 1968; "Prevention of Rheumatoid Deformity," Ontario Medical Association Annual Meeting, May 8, 1968.

A. T. JOUSSE presented results of "A Follow-up Study of Life Expectancy and Mortality in Transverse Myelitis" to the Sixteenth Spinal Cord Injury Conference of the Veterans Administration in September 1967 at Long Beach, California.

#### PUBLICATIONS

GODFREY, C. M. "The Family Doctor and Expo" (*Applied Therapeutics*, vol. 9, no. 6, July 1967, p. 587).

—— "History of the Sections of Medicine" (*Academy of Medicine Bulletin*, vol. 41, no. 1, Oct. 1967, p. 19).

—— "Medical Journalism, Old Style" (*Academy of Medicine Bulletin*, vol. 41, no. 4, Jan. 1968, p. 77).

—— "Prostheses for Cancer Patients" (*The Canadian Nurse*, July 1967, pp. 41-3).

GODFREY, C. M., and JOUSSE, A. T. "Rehabilitation Requirements for Electronic Medicine" (*Proceedings of International Electronics Conference*, Sept. 1967, paper no. 67054).

GODFREY, C. M., and LAWSON, G. A. "Pedal Pressure Changes during Weight Bearing" (*Journal of the Canadian Physiotherapy Association*, vol. 20, no. 1, Feb. 1968, pp. 17-20).



- GODFREY, C. M., and SMYTHE, H. A. "Hand Deformity and its Prevention" (*Journal of the Canadian Physiotherapy Association*, vol. 20, no. 2, April 1968, pp. 101-4).
- JOUSSE, A. T., WYNNE-JONES, M., and BREITHAUPT, D. J. "A Follow-up Study of Life Expectancy and Mortality in Traumatic Transverse Myelitis" (*Canadian Medical Association Journal*, vol. 98, no. 16, April 20, 1968, pp. 770-2).
- WARD, J. F., GODFREY, C. M., and JOUSSE, A. T. "An Intensive Summer Speech Therapy Programme for Children" (*Canadian Journal of Public Health*, vol. 59, no. 2, Feb. 1968, pp. 54-6).

## DIVISION OF AUDIO VISUAL RESOURCES

*Under the direction of Dr. J. N. Swanson*

The Division of Audio Visual Resources for the Faculty of Medicine is in the process of being organized. The Faculty of Medicine Sub-Committee in television (Chairman, Dr. D. Clarke), in the fall of 1967, recommended the appointment of Dr. Norrie Swanson as Director for the Audio Visual Resources of the Faculty of Medicine. This came into effect on January 1, 1968.

Prior to that date Dr. Swanson, as Chairman of the Canadian Medical Association Audio Visual Education Committee, had organized, in close co-operation with Dr. Ian Macdonald, Associate Dean and Director of the Division of Postgraduate Medical Education and Dr. Jan Steiner, Associate Dean for Student Affairs, a conference on the use of Audio Visual Aids in Medical Education. This two-and-one-half-day conference, held at the Inn on the Park, Toronto, in September 1967 was considered a great success. It attracted 164 participants, representing every medical school and many governmental health agencies in Canada. A teaching faculty of 17 drawn from Canada, the United States and Europe and sponsored by Geigy Pharmaceuticals gave prepared papers, all illustrated by slides, films or tapes, on the subject of the various forms of audio visual aids that could be used in the teaching of undergraduate and graduate students of medicine.

The proceedings of this conference were published *in toto* in two successive issues of the *Canadian Medical Association Journal* in 1968. Subsequently, reprints of the conference proceedings were published and over 1,000 copies distributed to the participants, to the medical schools, medical libraries and other relevant bodies in Canada, the United States and Europe.

A further workshop is planned to demonstrate techniques with video tape and live television presentation, as well as the exploration of several theories of medical education.

The current activities of the Audio Visual Division have been in the planning field in order to equip the new Medical Sciences Building with such resources and personnel as will provide for the new curriculum adequate medical illustrations, graphics, photography for slides, transparencies and films and television programmes both live and taped.

A survey is also being carried out, in association with the Planning Committee of the Ontario Hospital Services Commission, to ascertain the audio visual needs of the affiliated teaching hospitals so as to enable them to participate in a future Health Science Closed-Circuit Television Network.

The Director visited Medical Audio Visual Departments in Baylor University in Texas, Oral Roberts University in Tulsa, Oklahoma, the University of Kansas Medical School, the National Medical Audio Visual Centre in Atlanta, Georgia, and the Medical School of Virginia in Richmond.

## RESEARCH

The techniques of history-taking by medical students was investigated using closed-circuit television in the Out-Patient Department of the Toronto General Hospital. This was part of a research project initiated by Dr. D. Stinson to examine the effectiveness of this method of improving interviewing and history extracting methods.



## HONOURS

Several members of the Photographic Department of the Division of Audio Visual Resources participated in the first annual Audio Visual Awards Competition of the Canadian Medical Association. Awards were as follows:

MR. A. M. WRIGHT, Head of the Department of Visual Education, Hospital for Sick Children (Art); MRS. J. R. IRWIN, Department of Visual Education, Hospital for Sick Children (Exhibit); MR. JAMES A. PEACOCK, Director of the Audio Visual Department, Western Hospital, MRS. M. G. GAETTENS, Department of Medical Illustration, Princess Margaret Hospital (35 mm Slides); MR. W. BRYSON, Department of Visual Education, Hospital for Sick Children, MRS. E. HOPPER, Hospital for Sick Children (Colour Drawing); DR. R. B. SALTER, Professor of Surgery at the Hospital for Sick Children (Film); MR. BARRY E. FLINT, Chief Medical Photographer, Hospital for Sick Children (Film on Siamese Twins).

It is rather remarkable that, in this first competition, the Department of Visual Education in the Sick Children's Hospital won so many of the Awards and Honourable Mentions.

## PUBLICATIONS

SWANSON, J. N. "Introduction to Conference on Audio Visual Aids in Medical Teaching" (*Canadian Medical Association Journal*, vol. 98, no. 23, June 8, 1968, pp. 1080-1).  
——— "Television in Medical Teaching" (editorial) (*Canadian Medical Association Journal*, vol. 98, no. 24, June 15, 1968, p. 1151).

## DIVISION OF LABORATORY ANIMAL SCIENCE

*Under the direction of Professor L. R. Christensen*

The Division was established in July 1967, with the appointment of Dr. L. R. Christensen as Director. Its responsibilities include organization and administration of the central animal facility in the new Medical Sciences Building; integration and development of other animal facilities in the Faculty of Medicine; development of educational programmes for caretakers and others; establishment of a diagnostic and control laboratory for laboratory animal disease; and co-operation with animal facilities of the affiliated hospitals.

The major activities at present are concerned with the new physical facilities being established. The plans for the animal facilities in the Medical Sciences Building were reviewed and some relatively minor changes made. In general, the basic planning of this area was good and no major revisions were necessary. Building 69 at the Dufferin Division of CMRL, which contains about 10,000 sq. ft. of space, was made available for conditioning and maintaining dogs, cats and other animals. The alterations necessary to adapt the building for this purpose, and the equipment necessary to operate it were presented to the Board of Governors, and approved contingent upon obtaining the necessary funds from the provincial government. As soon as these funds become available, alterations will begin. It is expected that this facility will serve not only investigators in the Medical Sciences Building, but also those from the Banting and Best Institutes, and the affiliated teaching hospitals.

The old Ontario Research Foundation Building at 121 St. Joseph St. has been acquired by the University essentially to house new appointees to the Faculty of Medicine until they can be established in the Medical Sciences Building or in the teaching hospitals. Two rooms are presently undergoing alterations to house the animals required by the staff, and the washing machines and other equipment



necessary to care for them properly. The animal facilities in the Banting and Best Institutes and at No. 1 Spadina Crescent are inadequate and in serious need of modernization. However, detailed plans for renovation must await final decisions on the ultimate occupants of these areas.

Since the Medical Sciences Building is not yet complete, an ideal opportunity is afforded to integrate building and cage designs to provide the optimum in comfort for the animals, and efficiency, economy and convenience in animal care. To this end, a considerable amount of time has been spent in selecting and in some cases designing cages and other equipment for the new building. The need for equipping several small units, such as 121 St. Joseph St., before occupancy of the Medical Sciences Building is affording an excellent opportunity to test these new cage and equipment designs before purchasing the large quantities required for that building.

The administrative and operating procedures of the Division will be modeled on those tested by experience in other large central facilities. The broad aspects have been presented to the Dean, his Executive Assistant, and the Chief Accountant, and will be the subject of continuing discussions in regard to details.

#### STAFF

Mr. Ernest Reid, formerly in charge of animal facilities at Warner Lambert and one of the two Canadians holding the Master Animal Technician's Certificate, has been appointed Chief Supervisor of the Division. He is one of the outstanding animal care supervisors in Canada.

In conjunction with the Personnel Office, apportionate job descriptions and salary ranges are being established for the Division. Since large central animal facilities are relatively new in Canada, the usual job classifications do not reflect accurately the training and responsibilities required of the Division's staff.

Some of the animal care staff will be transferred from their present departments to the Division when the central facility begins operating. It is expected that additional personnel will be necessary, not only at the caretaker level, but in intermediate supervisory positions.

A veterinary pathologist, trained in diseases of laboratory animals, is being recruited to head the diagnostic and control section.

#### TRAINING PROGRAMMES

There have been no organized training programmes for animal caretakers in Canada. Under the joint auspices of the Division and the Canadian Association for Laboratory Animal Science, the first Canadian programme has been organized in Toronto. The response to this initial effort has been overwhelming, 99 students being registered. Arrangements have been made with the Technician's Certifying Board of the AALAS so that Canadian technicians may qualify for certification on the same basis as members of the American Society. The teaching staff is composed of volunteer lecturers from the Division, from the affiliated hospitals, from other faculties of the University and from ovc. The willing response of all who have been asked to aid in teaching the course has been most gratifying.

#### DIRECTOR

The Director has been asked to participate in a variety of facets of Canadian animal care, best illustrated by the following appointments: President-elect, CALAS; Executive Board, CALAS; Executive Board, Metropolitan Toronto Branch, CALAS; Resources Panel, Canadian Council on Animal Care; Advisory Board, Biomedical Institute, University of Guelph; Chairman, Education Committee, CALAS.

At the request of Vice-President Hamilton, a survey of animal facilities in other colleges and divisions of the University is being conducted. As a result of this, some active collaboration is beginning between the Division and these other units, and it



appears likely that this co-operation will increase in the future. In addition, the Director has been asked to advise and consult in the planning of the new animal facilities for the Toronto General Hospital, the Wellesley Hospital and McMaster University.

Temporary animal facilities will be established in Block "E" of the Medical Sciences Building to serve those investigators moving into this Block in July. Some time between the first of the year and mid-summer, most, if not all, of the permanent animal facilities will become available, at which time full operation and integration of the Medical Sciences Building facility with other units will become possible.

## EDUCATIONAL RESEARCH UNIT

*Under the direction of Professor J. F. Flowers*

The Educational Research Unit consisted of the Director, one secretary, one research assistant and two computer programmers. To this nucleus, one psychologist, Dr. Jerome K. Conway, and one additional research assistant was added by June 1968. One additional professional staffman, Dr. Arthur I. Rothman, a psychologist with expertise in educational measurement, was added on September 1, 1968. Associated staff included a clinical psychologist, Dr. Bruce J. Quarrington, and Dr. Robert S. Julius, Director of Medical Computing in the Faculty of Medicine.

The Unit continued to assist the departments in the development of objective measures of student performance. In the past year, the Academic Service Unit provided a multiple-choice testing service for more than 50 different examinations. Innovations in testing methods included the design of models of objective questions which are capable of handling multiple correct answers.

It is apparent that in the future, a centralized data bank of objective-choice questions should be put into operation to carry out efficiently changing patterns of student evaluation necessitated by the introduction of the new curriculum.

It is proposed to develop a procedure that will, given a sufficiently large number of sound objective-type questions, enable exemplary examinations (department or system based) to be easily assembled that will meet the criteria set by individual examiners or an examination committee.

A programme of intellectual and non-intellectual testing of first-year pre-medical and medical students was begun in September 1967. This testing programme was designed to ascertain whether psychological tests could predict dropout from medical school, personality disturbance in medical school, difficulties which certain types of students experience in specific subjects, and overall medical school performance.

The experimental psychological tests included measures of knowledge, intellect, motivation and personality. It is expected that it will require three years of testing to establish an adequate group of psychological tests which will be studied to determine their effectiveness as predictors.

We continued our study of the academic performance of various categories of medical students with a view to improving our admission procedures. Because available records were inadequate, the study was limited to those students who entered first-year medicine in 1958, 1959, 1960 and 1961.

A study has been undertaken during the past two years and a questionnaire developed for evaluating the career choices of medical graduates of the University of Toronto. In addition, relationships of career choice will be studied with regard to levels of academic standing during the doctors' undergraduate years. The questionnaire was first given in 1967 for those graduating in medicine from 1965 and will continue to be given each year for an indefinite number of years.

An important new venture concerns the development of an instructional laboratory. Virtually every educator who writes of the problems of achieving educational objectives calls for an increased interactive contact between student and subject



matter. A difficulty arises, however, in the specifics of implementing such an educationally relevant course of action, for the implementation presumes a well-developed set of empirically supported instructional prescriptions. This problem has become most focal in the use of presentation devices which are now supplemental to traditional educational practice. Here the rapid proliferation of instructional technologies has clearly outstripped a parallel understanding of the learning efficiencies to be obtained in their individual or integrated usage.

Education in the health sciences has relied upon several of these technologies. In the future, it can be expected that there will be an even heavier reliance on such resources if the demands for both quantitative and qualitative efficiencies in training are to be meaningfully answered. An instructional resources laboratory as applied to education in the health sciences is needed as the basis for research and development activities which will be supportive of the implementation decisions that educators will be required to make in this area.

The laboratory would have its focus in a learning environment consisting of the study carrel designed to present information to the student through several instructionally relevant display outputs. The carrel would be an independent learning sources centre in that it would be utilized to control student contact under a variety of resource combinations (e.g., books, films, slides, videotape, computer output). Ultimately it would be desirable to integrate all displays under computer control and also to incorporate the function of several carrels within a general system of simultaneous, yet independent, computer-assisted instruction.

Heretofore the application of various technologies to instructional activity has proceeded almost entirely along separate and unrelated lines. The concept of a focused communications environment exemplified in the proposed laboratory thus represents an innovative approach to the problem of adapting technological resources to serve instructional purposes. It is in the feasibility of exploring student interaction with an integrated system of resources that the proposed laboratory offers realistic possibilities for documented efficiencies in health sciences instruction.

An instructional resources laboratory would provide a centralized, flexible facility in which the varied problems of resource utilization can be examined with a high degree of precision and sophistication. This would permit instructors in the health sciences to assess the efficiency of instructional resource options prior to costly implementation of untried systems. It would also allow the formulation of a set of instructional prescriptions, hopefully valid across several areas of health sciences education. In addition, the concept of an integrated communications/learning environment in itself could become a major focus. Whether, and how, the fully automated study carrel can bring student and subject matter together in a highly interactive dialogue mode could be a significant contribution of the laboratory.

## ACADEMIC SERVICE UNIT: TESTING SERVICE

*Under the direction of G. Grant Clarke*

The Testing Service began in October 1966, directed by Dr. J. F. Flowers and maintained by Mr. J. Long, as part of the Educational Research Unit. During the academic year 1966-67 there were approximately 50 test sessions, and 8,000 examinations scored and analyzed.

In the summer of 1967, the operation was administratively transferred to the newly created Academic Service Unit. New programmes, with added features and more flexibility, were developed in late 1967 on the 1130 computer at the Faculty of Dentistry. (The co-operation of the Faculty of Dentistry, in particular Dr. D. Lewis, is gratefully acknowledged.) These programmes produce an examination report with the following features: raw scores, percentage scores, and standardized scores on the total test, as well as corresponding scores on the best test items chosen



on the basis of the analysis; a response pattern analysis and point biserial correlation coefficient for each item; a histogram distribution of examination scores; and a literal description summarizing probable faulty test items on the basis of the item analysis. A manual, "Multiple-Choice Testing Service," was issued describing these features. In December 1967, another programmer, Mr. Doug Fujiwara, joined Mr. Long.

In the academic year 1967-68, the testing service scored and analyzed over 100 examinations with about 16,000 student papers. Most of the examinations were in basic sciences for undergraduate medical students, although other groups of students such as Nurses, Physical and Health Education, Physical and Occupational Therapy and Dentistry also used the Testing Service facilities. In 1966-67, three departments in the basic sciences (Pharmacology, Physiology and Pathology) administered a combined term examination for second-year Medicine. This year Preventive Medicine, Neuroanatomy and Bacteriology also took part in this combined term examination. The clinical departments showed no increase over the previous year in their usage of the Testing Service for undergraduate testing. Paediatrics used the Testing Service for term tests; Obstetrics and Gynaecology and Surgery used the Testing Service for final examinations only.

The users of the Testing Service exhibit much variability in their requirements. This variability can now be readily handled, and new forms of testing are being developed. For instance, programmes and special forms for compound answer questions were developed and used for the third-year undergraduate examination in Therapeutics. This method allows up to ten responses per question, any of which may be correct. It appears to be a very flexible testing method, which may be utilized to a greater extent, especially in the clinical sciences, next year.

The academic year 1967-68 was also marked by an increased interest in the utilization of objective testing for postgraduate students. The Department of Medicine administered a standard 5-choice per item test, and the Department of Anaesthesia used the new compound testing method.

Since the inception of the Testing Service two years ago, considerable improvements have been made in the speed and efficiency of the Service. Computer turn-around time still accounts for most of the time (current average: 3 days) required to process test results. It is hoped that in the near future the significance of this factor will decrease.

MEDICAL ATHLETIC ASSOCIATION

(September 1967 to June 1968)

<i>Honorary President</i>	. . . . .	Dr. N. T. McPhedran
<i>Honorary Secretary-Treasurer</i>	. . . . .	J. E. McCutcheon
<i>Past President</i>	. . . . .	B. R. Taylor
<i>President</i>	. . . . .	R. L. Walker
<i>Vice-President</i>	. . . . .	M. Smith
<i>Secretary-Treasurer</i>	. . . . .	H. Stein
<i>Quartermaster</i>	. . . . .	H. Shustik
YEAR REPRESENTATIVES		
<i>IV Medical Year</i>	. . . . .	M. Unger
<i>III Medical Year</i>	. . . . .	M. Young
<i>II Medical Year</i>	. . . . .	C. Baycroft
<i>I Medical Year</i>	. . . . .	W. Shoichet
<i>II Premedical Year</i>	. . . . .	K. Minaker
<i>I Premedical Year</i>	. . . . .	B. Siegel

It is my pleasure to report that the 1967-68 season has been one of the most successful ever enjoyed by the Medical Athletic Association, in terms of both participation and competition.



Medicine entered more teams and suffered fewer defaults than before in its recent history. Championships were won by the waterpolo and volleyball teams, and teams from nearly every other sport including football earned places in final championship games.

Both the annual Golf Day and Ski Day were held, but were poorly attended due to adverse weather conditions. The Annual Awards Dinner was held on March 12, with Dean Chute, Dr. McPhedran, and J. E. McCutcheon of the Intramural Athletic Association as guests at the head table. Mr. McCutcheon, in a very interesting talk, outlined the plans for the future of Intramural athletics, and as a complete surprise announced that the T. A. Reed Trophy, symbolic of excellence in competition and participation, had been won by Medicine for the first time in twenty-three years. Also at the banquet, five athletic mugs and thirty-eight first colours were awarded. The first colour (Medical "M") was redesigned this year and we are indebted to Miss Judith Wunderly of the Department of Art as Applied to Medicine for the time and effort that she devoted to this endeavour.

Other honours earned by members of this body include the George M. Biggs Trophy by Bryce Taylor, and the election of Alan Giachino to a seat on the Athletic Directorate.

I would like to thank the executive and the Association as a whole for their contribution to the success of this year, and, on behalf of the members, to wish Paul Kent and the new executive every success in the coming year.

BOB WALKER

MEDICAL WOMEN'S UNDERGRADUATE ASSOCIATION

(September 1967 to May 1968)

<i>Honorary President</i>	. . . . .	Dr. Mary Ann Hooey
<i>President</i>	. . . . .	Karen L. Cronin
<i>Vice-President</i>	. . . . .	Jacqueline W. Moore
<i>Treasurer</i>	. . . . .	Gail Porter
<i>Secretary</i>	. . . . .	Klara Hecht
<i>1st Premedical Representative</i>	. . . . .	Mary Vearncombe

In early September a coffee party was held by the Second Premedical girls to welcome the First Premedical girls into the Faculty. At this party, I welcomed the girls and the two years made friends so that the junior year had someone from a more senior year to help them with any information needed then or later.

In early November the Initiation Banquet was held in the Great Hall of Hart House. This was a combined banquet by both the mwua and the Medical Women's Doctors Association. All new girls to the Faculty were initiated into the mwua. Dr. Betty Steiner, a psychiatrist, gave an interesting talk on "the Hippy."

At Christmas twenty-five dollars worth of gifts were donated to Settlement House. A Christmas party was held in the Duncan Room - dinner and folksinging following. Entertainment was supplied by Jackie Moore's husband and friend. The Medical Women's Doctors Association held a dinner-theatre party in March for the graduating year - steak dinner and "Charlie Brown" at the Playhouse. This evening was greatly enjoyed by all.

To end the year, the girls in third-year Medicine gave the graduating year a Wine and Cheese party held at Dr. Hooey's home. At this party each graduating girl received a coffeespoon (sterling silver) with "mwua 6T8" engraved on it. Dr. Hooey, as well, presented each girl with a red rose corsage (a gesture very much appreciated by the girls of fourth-year Medicine).

The executive has now been chosen for next year with Chris Koch as President. Many thanks should be given to the outgoing executive and Dr. Hooey for their assistance.

KAREN L. CRONIN



MEDICAL WOMEN'S ATHLETIC ASSOCIATION

(September 1967 to May 1968)

<i>President</i>	. . . . .	Pat Blachford
<i>Vice-President</i>	. . . . .	Violet Shadd
<i>Treasurer</i>	. . . . .	Gail Porter
<i>Secretary</i>	. . . . .	Carolyn de Marco
<i>1st Premedical Representative</i>	. . . . .	Eileen Phillips

Again in this past academic year 1967-68 the women of the Faculty of Medicine participated in the athletic programme as set up by the Women's Athletic Association (WAA) of the University of Toronto. We attempted to have active representatives to all sports clubs and interfaculty sports committees, so that the girls could be well informed in both individual and team sports. Usually we strongly urge the students in premedical years to take an active part in our programme, as a sports representative, team manager or player; however in the past year there has been a marked decline in interest among the girls in these years, all of whom felt academic work to be far more important.

All our teams, although small, proved highly spirited and very efficient. Early in the season the swim team placed third in the interfaculty and intercollege campus swim-meet. Next, the basketball team led by Violet Shadd of 1 Meds, (our only intercollegiate basketball player) and by two newcomers from Art as Applied to Medicine, bounced its way to the semi-finals only to be beaten by 1 point in overtime against Victoria College (the eventual champions). The volleyball and ice hockey teams were not quite as successful in their leagues.

Our annual athletic banquet was held again this year at the Nanking restaurant, marking the end of the athletic season. At this time Miss Anne Hewett, our guest at the banquet, as Acting Director of the Women's Athletic Association of the University presented intercollegiate 'T's' to Violet Shadd for basketball and Pat Blachford for Ice hockey, and an interfaculty 'T' to Robin Williams. The only Medical 'M' went to Widit McLean (III Medicine). Unfortunately no one this year qualified for a premedical shield.

I should like to thank this year's executive for their support and extend best wishes to the new executive in their continuing efforts to keep the Medical Women's Athletic Association well represented in campus sporting activities.

PAT BLACHFORD

BIOLOGICAL AND MEDICAL DIVISION  
UNIVERSITY LIBRARY

*Reported by H. C. Sholler*

Continued Faculty interest in the Biological and Medical Division of the University Library has resulted in the addition of 244 new serial titles to the collections, while the number of monographs added amounts to approximately 3,700 volumes. Use of the collections continues to increase, indicating the high level of teaching and research. Faculty loans amounted to some 24,749 as of April 1968, contrasted with 20,745 as of April 1967 representing an increase of 20 per cent. The Professors Delivery Service has proved very worthwhile with a resulting increase of 21 per cent in use over last year so that an additional library assistant will be added to the staff as of July 1. Loans to hospitals increased from 4,662 to 5,587, a percentage increase of 20 per cent.

A further service which some of the professors in the Faculty of Medicine are

enjoying is a “current awareness” programme based on interest profiles and utilizing magnetic tapes from the Chemical Abstracts Service in Columbus, Ohio. The programme is still, at this point, very much a pilot project, but the good results obtained so far would indicate that it will soon be expanded to include more faculty members and magnetic tapes of wider interest.

The question of official library collections in a National Medical Bibliographic Centre has finally been resolved with the announcement that the National Science Library in Ottawa will bear this responsibility. The National Science Library has already appointed new staff and begun to subscribe to over 2,000 periodicals in the field of health sciences in order to make this new responsibility a reality in service.

REPORT ON REGISTRATION, SESSION 1968-1969

First Premedical Year . . . . .	135
Second Premedical Year . . . . .	123
First Medical Year . . . . .	170
Second Medical Year . . . . .	182
Third Medical Year . . . . .	172
Fourth Medical Year . . . . .	171
Art as Applied to Medicine . . . . .	12
Bachelor of Science (Medicine) Summer Session . . . . .	8
(also registered in undergraduate medical years)	
Diploma in Medical Radiology . . . . .	39
Diploma in Psychiatry . . . . .	66
Diploma in Anaesthesia . . . . .	20
Sessional Anaesthesia . . . . .	15
Diploma in Clinical Chemistry . . . . .	5
Ophthalmology . . . . .	26
Oto-Laryngology . . . . .	21
Other Postgraduate Students . . . . .	409
Physical and Occupational Therapy . . . . .	315
Speech Pathology and Audiology . . . . .	18
Student Teachers . . . . .	4
	1,911

FELLOWSHIPS, SCHOLARSHIPS, MEDALS AND PRIZES

GRADUATE

W. P. Caven Memorial Fellowship . . . . .	D. Glaister, B.Sc., Ph.D.
William Goldie Prize . . . . .	A. Rapoport, M.D.
Karen Jackson Award . . . . .	W. Gregorowicz, M.D.
George Armstrong Peters Prize . . . . .	W. P. Bobenchko, M.D., B.Sc., (Med.), F.R.C.S.(C)
Anna Bradbury Springer Award . . . . .	P. Tze-him Wei, M.B., B.S., M.R.C.P. (Edin.)
Edward Christie Stevens Fellowships . . . . .	S. S. Smith, M.D. R. C. Frecker, M.D. W. G. Tatton, M.D. H. MacKay, B.A., D.D.S. Miss A. Hedlin, B.Sc.N., M.Sc. A. Bennick, D.D.S., M.Sc.D. J. Brebner, M.D.

*Additional Postgraduate Fellowships*

Nellie L. Farthing Fellowship . . . . .	V. K. Murthy, Ph.D.
Arch. Hutchison Fellowship . . . . .	E. H. Silver, M.D.
Alexander McPhedran Research Fellowship . . . . .	E. H. Silver, M.D.
John Alexander Stewart Fellowships . . . . .	V. K. Murty, Ph.D. B. O. Okuwobi, M.D.

UNDERGRADUATE

*Fourth Medical Year*

Cody Gold Medal . . . . .	P. F. Halloran
Cody Silver Medal . . . . .	H. Vellend



Cody Silver Medal . . . . .	G. R. French
Dr. Benjamin W. Appleton Prize in Psychiatry . . . . .	Miss M. E. Bradley
J. P. Boley Prize in Ophthalmology . . . . .	H. G. J. Bright
Butterworth Prize . . . . .	W. K. Laird
Irving Heward Cameron Undergraduate Scholarship . . . . .	P. F. Halloran
Chappell Prize in Clinical Medicine . . . . .	P. F. Halloran
Medal of the Consul General of France . . . . .	B. N. French
Dr. Jacob Goldstein Scholarship . . . . .	J. T. Axler
Hendry Memorial Scholarship . . . . .	P. F. Halloran
Issei Scholarship in Medicine and Surgery . . . . .	P. F. Halloran
Dr. Louis Kagan Memorial Award . . . . .	H. G. J. Bright
Medical Alumni Association Scholarships . . . . .	B. N. French } Aeq. P. A. Jordan }
Ellen Mickle Fellowship . . . . .	H. Vellend
Ontario Medical Association Prize in Preventive Medicine . . . . .	J. E. Ewen
Dr. Roy Simpson Scholarship in Paediatrics . . . . .	G. R. French
Starkman Memorial Scholarship in Medicine . . . . .	J. A. Wright

*Third Medical Year*

Dr. F. J. Colling Scholarship (renewal) . . . . .	J. S. Keystone
William Edward Corlett Memorial Scholarship (renewal) . . . . .	N. D. Berman
Franckel Memorial Award . . . . .	G. Rungi
Charles E. Frosst Scholarship . . . . .	A. A. Minor
J. F. Hartz Company Prize in Ophthalmology . . . . .	D. A. Balaishis
J. F. Hartz Company Prize in Oto-Laryngology . . . . .	J. D. Kempston
Frank W. Horner Gold Medal . . . . .	D. W. Dempster
Dr. Mitchell Kohan Scholarship . . . . .	P. J. Muller
Saddington Medal in Pathology . . . . .	G. Rungi
Starkman Memorial Prize in Pharmacology and Therapeutics . . . . .	A. J. Shoichet
Starkman Memorial Scholarship in Preventive Medicine . . . . .	Miss F. J. Reddekopp
Samuel J. Streight, O.B.E., M.D., Scholarship in Internal Medicine . . . . .	J. S. Keystone
Dr. C. S. Wainwright Memorial Scholarship (renewal) . . . . .	A. J. Shoichet
Major William McLean Walwyn Award (renewal)	D. F. Symons
Walter F. Watkins Scholarships . . . . .	shared by: A. Chaiton, T. E. Daglish, D. W. Dempster, Miss P. E. Fitzsimmons, Miss P. J. Smith, R. J. Wilson

*Second Medical Year*

Dr. F. J. Colling Scholarships . . . . .	shared by: G. C. Ebers, S. Greenberg, M. A. Hutcheon, P. G. Levy, E. M. Mintz, P. R. McLaughlin
Geoffrey Samuel Gangbar Memorial Prize . . . . .	P. D. Scott
Posluns Brothers Scholarship . . . . .	S. Greenberg } Aeq. Miss N. H. McKee }
Dr. C. S. Wainwright Memorial Scholarship (renewal) . . . . .	Miss N. H. McKee
Walter F. Watkins Scholarships . . . . .	shared by: A. O. Davies, W. K. Evans, H. Krieger, S. L. Lib- rach, E. W. Turgeon

*First Medical Year*

Dr. Thomas Arnold McCormick Scholarship . . . . .	E. Magi } Aeq. A. D. Graeb }
Dr. and Mrs. M. A. Pollock Award . . . . .	Miss S. Chu
Starkman Memorial Scholarship in Anatomy . . . . .	J. R. B. Bristowe } Aeq. Miss J. E. Haglund }
Dr. C. S. Wainwright Memorial Scholarships . . . . .	shared by: E. L. Book, J. R. B. Bristowe, Miss J. E. Haglund, R. E. Hibbard

Walter F. Watkins Scholarships . . . . .	shared by: R. D. Panabaker R. J. Rowland C. Shustik S. Silverberg Miss K. M. Tusiewicz
John Zoberman Scholarship . . . . .	D. J. McNeeley

*Second Premedical Year*

Famous Players Canadian Corporation Scholarship	L. Eason
Fulford Scholarship (No. 4 Canadian General Hospital . . . . .)	Miss A. R. Gishman

*Division of Rehabilitation Medicine*

Beatrice Hally Memorial Prize . . . . .	Miss K. L. Lord
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## ANAESTHESIA

*Under the direction of Professor R. A. Gordon*

This session has been devoted to the continued development of the academic programme of the Department, and particularly to the evaluation and modernization of our teaching methods, planning for the new Undergraduate Curriculum, and the planning and development of essential research facilities within the Department. It has been evident, however, that there has been a pervading sense of uneasiness and frustration throughout the Department, arising from the uncertainties surrounding the provision of future facilities and staffing to ensure the developments considered essential to produce an environment of academic excellence.

The teaching of undergraduate students in the third year has continued in the pattern established during the past several sessions. In the fourth year small group block-teaching has been instituted in two of the teaching hospitals and has proved to be more useful than the intermittent exposure of the students to the activities of the Department. Unfortunately, the block of time available has been too short and it is hoped that it may be extended during the next session. Emphasis in the undergraduate course is placed on resuscitation, maintenance of the airway, ventilation and general care of the unconscious patient.

There were fifty postgraduate students in the Department during the year, twenty-two of whom were registered for the Diploma, the remainder being sessional students.

The Diploma in Anaesthesia of the University of Toronto was awarded to Dr. D. A. Baird, Dr. A. F. D. Cole, Dr. P. Graves, Dr. G. H. Hodgson, Dr. R. W. Lamont, Dr. A. A. Scott and Dr. D. J. Steward. Three candidates were unsuccessful in the examination.

The Department gave a one-week Refresher Course for General Practitioners in November, 1967. Members of the Department have contributed to a number of postgraduate courses in other Departments of the Faculty.

The ninth Dr. Harry Shields Lecture was given on December 7, 1967, by Professor Edmond I. Eger II of the University of California, San Francisco. Professor Eger's subject was "The Uses of Anaesthetic Potency." Visiting Professors during the session were Professor J. P. Payne of the Department of Anaesthetic Research of the Royal College of Surgeons of England, October 2 to 5, 1967; Professor Leroy Vandam, Harvard University from October 30 to November 3, 1967; Professor Edmond I. Eger II, December 4 to December 8, 1967, and Professor R. G. B. Gilbert, McGill University, from April 1 to 6, 1968. These Visitors made significant contributions to the postgraduate and graduate teaching programme in the Department.

The Department has been pleased to welcome a number of other distinguished



Visitors during the year, amongst them the following: Dr. W. N. Rollason, University of Aberdeen; Dr. Thomas W. Baillie, Royal Infirmary, Dumfries; Dr. Emerson Moffitt, Mayo Clinic, Rochester, Minnesota; Dr. Russell Cole, Royal Melbourne Hospital, Melbourne, Australia; Dr. Ian Geddes, Liverpool University; Dr. Cedric Prys-Roberts, Nuffield Department of Anaesthetics, Oxford; Professor Ole Secher, University of Copenhagen.

Dr. Lucien E. Morris has joined the Department as Professor and Anaesthetist-in-Chief at St. Michael's Hospital. Dr. Charles Bryan has been appointed Assistant Professor in the Department. Dr. Sydney Ozer has joined the Department as a Clinical Assistant on the staff of the Toronto Western Hospital, and Dr. Peter Heyland has been a Clinical Teacher at the Toronto General Hospital.

Professor Shirley Fleming returned to the Department on March 1, 1968, after five and one-half years as Professor and Head of the Department of Anaesthesia of the University of Lagos Medical School in Nigeria. Dr. John Jacobs and Dr. Kirk Weber have spent the year as Lecturers in the Department in Lagos. This Department continues to sponsor a programme of assistance to the Lagos School, with the financial assistance of the Education Division of the External Aid Office of the government of Canada.

Professor R. A. Gordon was Visiting Professor at the University of Lagos Medical School in January 1968. During his visit, he conveyed the official greetings of the University of Toronto on the occasion of the installation of the Chancellor of the University of Lagos.

Professor Fairley was Visiting Professor in the Department of Anesthesia, New England Medical Center, Tufts University, and at the University of Miami during November 1967; at the San Francisco Medical Center, University of California and at the University of Utah during February 1968. Professor Alan Conn was Visiting Professor at the University of Tennessee in March 1968 and at Columbia University Medical Center, Presbyterian Hospital, New York City in April 1968. Dr. I. A. J. Sloan was Visiting Professor in Caracas, Venezuela, at the Training Centre for South America of the World Federation of Societies of Anaesthesiologists, from January 1 to March 31, 1968. Professor H. B. Fairley and Professor Lucien Morris have been appointed to the Clinical Sciences Division of the Graduate School. Professor Fairley has been elected to the Editorial Board of "Applied Therapeutics" and is an Associate Editor of "Survey of Anesthesiology." Professor Alan Conn and Dr. J. E. York have been active in the development of a school for Inhalation Therapy Technicians based at the Hospital for Sick Children and the Toronto General Hospital. Dr. Iain MacKay has continued to act as Chairman of the Metropolitan Toronto Hospital Council Committee on Disaster Planning, as representative of the Canadian Medical Association on the Emergency Health Services Special Advisory Committee to the Minister of National Health and Welfare and as Area Surgeon for the Central Ontario Area of St. John's Ambulance Society.

## RESEARCH

Professor H. B. Fairley has established a technique of estimating alveolar-arterial nitrogen gradient by gas chromatography as a means of examining the significance of ventilation-perfusion inequality as a component of enlarged physiological shunts. Under the direction of Dr. Fairley, Dr. Alan Laws has continued his study of changes in lung volume occurring in association with anaesthesia and Dr. John Thistlewood has examined the influence of the relationship of injection time to phase of intermittent positive pressure ventilation on cardiac output values determined by dye dilution.

Dr. Brian Marshall has continued investigations on the problem of cerebrovascular spasm in association with Dr. W. Loughheed of the Department of Neurosurgery.

Dr. Beverley Britt, in association with Professor Werner Kalow in the Depart-



ment of Pharmacology, has continued her study of cellular responses involved in drug-induced hyperthermia and the genetic pattern of this response. Dr. John Brebner has been engaged under Professor Kalow's direction in a study of esterases of lung tissue. Dr. Brebner has been supported by an Anna Bradbury Springer Fellowship.

#### SCHOLARLY ADDRESSES

Professor R. A. Gordon addressed the Annual Meeting of the West African Association of Surgeons at Lagos, Nigeria, in January 1968 as part of a Symposium on Regional Anaesthesia. His subject was "Methods and Applications of Regional Anaesthesia of the Femoral and Obturator Nerves." Dr. Wells Renwick addressed the same meeting on the subject of "The Use of Epidural Anaesthesia in Caesarean Section."

Professor H. B. Fairley addressed the 59th Annual Meeting of the Manitoba Medical Association in Winnipeg in October, 1967, his subjects being "Ventilators" and "Problems of Anaesthesia." Professor Fairley also addressed the Section of Anaesthesia of the Ontario Medical Association in October 1967 on "Physiology of Intermittent Positive Pressure Ventilation" and "Complications of Prolonged Intubation and of Tracheostomy"; the Southern Medical Association, Miami, Florida, in November 1967 on "Intensive Care" and "Postoperative Respiratory Failure"; the Department of Anaesthesia of the University of Miami in November 1967 on "The Selection of a Mechanical Ventilator" and "The Management of Crushing Injuries of the Chest"; the Boston Respiratory Therapy Conference in November 1967 on "The Management of Patients with Respiratory Failure" and as a member of a panel on "Respiratory Failure Units"; as a member of a panel of the New York State Society of Anesthesiologists 25th Postgraduate Assembly in December 1967 on the subject of "The Anesthesiologist in Acute Medicine"; as panellist at the Meeting of the Royal College of Physicians and Surgeons of Canada in January 1968 on the subject of "Shock — Respiratory Homeostasis"; the Department of Anesthesiology, San Francisco Medical Center, University of California, February 1968 on "Laryngeal and Tracheal Complications of Prolonged Intermittent Positive Pressure Ventilation"; the Postgraduate Course in Anesthesiology, University of Utah, in February 1968 on "Mechanics of Breathing," "Diagnosis of Respiratory Failure," "Management of Crushing Injuries of the Chest," "The Selection of a Mechanical Ventilator," "The Central Venous Pressure Line"; the Quebec Division of the Canadian Anaesthetists' Society in March 1968 on "Problems in the Management of Respiratory Failure"; the Department of Anaesthesia, Queen's University, April 1968 on "The Current Status of Hyperbaric Medicine"; the Oshawa Medical Society in May 1968 on "The Management of Respiratory Failure" and the Annual Meeting of the Canadian Anaesthetists' Society in Ottawa in May 1968 where he was Chairman of a Panel on "Complications of Tracheotomy and Prolonged Endotracheal Intubation."

Professor A. W. Conn addressed the Florida State Society of Anesthesiologists in September 1967 on "The Paediatric Story" and "Tracheotomy vs. Tube" and during the same month took part in a Symposium on New Electrical Hazards in our Hospitals, discussing "The Current Status of Flammable Anaesthetics in Hospitals." In January 1968 Professor Conn addressed the Children's Memorial Hospital, Chicago on "Recent Advances in Paediatric Anaesthesia" and the sixth Clinical Conference in Paediatric Anaesthesia at the Children's Hospital in Los Angeles, California, on "Complications during Induction," "Use of Halothane in the Paediatric Patient," "Clinical Use of Relaxants in Infants and Children," and "Progress in Anaesthesia in Canada"; in March 1968 at McGill University, Montreal "Recent Advances in Paediatric Anaesthesia"; at the University of Tennessee, Memphis, Tennessee, on "Inhalation Therapy in Paediatrics" and at the Quebec Division of the Canadian Anaesthetists' Society in Quebec City, "Role of the Anaes-



thetist in Paediatric Intensive Care"; in April 1968 at Columbia University Medical Center, New York City, "Anaesthetic Complications," "Paediatric Intensive Care," "Recent Advances in Paediatric Anaesthesia," and in May 1968 to the Department of Anaesthesia, University of Indiana, "Anaesthesia Management of the Neonate," and to the Department of Anaesthesia, University of Minnesota, "Fluid and Electrolyte Balance in Paediatric Anaesthesia" and "Complications in the Postoperative Period."

Professor Lucien Morris addressed the Section on Anaesthesia of the Academy of Medicine of Hamilton on "Changing Concepts of Ventilation in Anaesthesia" in May 1968.

Professor D. C. Finlayson presented a lecture on "Electrolyte Balance in Acute Medical and Surgical Emergencies" at Laval University, Quebec, and took part in an Anaesthesia Seminar at McKellar General Hospital, Fort William, Ontario, where he lectured on "Body Composition Alterations with Anaesthesia and Surgery," "Pathophysiology, Diagnosis, and Management of Pulmonary Embolism," "New Concepts in the Evaluation and Management of Shock," "Use of Neuroleptanalgesia" and "The Management of Intravenous Regional Block."

Professor A. J. Dunn addressed the Sudbury Medical Society on April 17, 1968, on the subject of "Fat Embolism."

Dr. J. M. Shapley gave an address entitled "In Defence of Code Z. 32—Safe Practice for Hospital Operating Rooms" in a Symposium on Control of Hazards in Hospital at Ottawa in September 1967, and addressed the Meeting of the Surveyors of the Canadian Council of Accreditation in Toronto in February 1968 on the subject of "Hospital Safety."

## PUBLICATIONS

- CONN, A. W. "Practical Policy for Non-explosive Anaesthesia" (*Hospital Administration in Canada*, vol. 9, no. 9, Sept. 1967, pp. 60–2).
- EVANS, D., and BOYES, H. W. "Chronic Catheterization of Blood Vessels in the Dog" (*Canadian Anaesthetists' Society Journal*, vol. 15, no. 2, March 1968, pp. 135–41).
- FAIRLEY, H. B. "Principles and Practice of Mechanical Ventilation" (*Applied Therapeutics*, vol. 10, Jan. 1968, p. 36).
- FAIRLEY, H. B., KERR, J. H., LAWS, A. K., and SELLERY, G. R. "The Avoidance of Postoperative Hypoxaemia: An Assessment of Three Techniques for Use during Anaesthesia" (*Canadian Anaesthetists' Society Journal*, vol. 15, no. 2, March 1968, pp. 152–62).
- GORDON, R. A. "The Canadian Contribution to the Anaesthesia Training Programme of the World Federation of Societies of Anaesthesiologists" (*Canadian Anaesthetists' Society Journal*, vol. 14, no. 6, Nov. 1967, pp. 495–9).
- MARSHALL, B. M., LOUGHEED, W. M., and GORDON, R. A. "Evaluation of the Effect of Anaesthetic Techniques on Survival after Intracranial Surgery for Ruptured Aneurysms" (*Canadian Anaesthetists' Society Journal*, vol. 15, no. 3, May 1968, pp. 227–31).
- RELTON, J. E. S., CREIGHTON, R. E., and CONN, A. W. "Fulminant Hyperpyrexia Associated with Anaesthesia" (*Anaesthesia*, vol. 23, no. 2, April 1968, pp. 253–8).
- SELLERY, G. R. "A Review of the Causes of Postoperative Hypoxia" (*Canadian Anaesthetists' Society Journal*, vol. 15, no. 2, March 1968, pp. 142–51).
- WILKES, F. C. D., OWEN-THOMAS, J. B., SWYER, P. R., and CONN, A. W. "Evaluation of a Respirator for Neonates" (*British Journal of Anaesthesia*, vol. 40, no. 1, Jan. 1968, pp. 61–4).

## ANATOMY

*Under the direction of Professor J. S. Thompson*

The Department of Anatomy has two major divisions: the sciences of Gross Anatomy, Embryology and Neuroanatomy are in one division and Histology forms the other. Members of each division carry out active programmes of teaching and research.

## TEACHING

The teaching duties in this Department divide themselves naturally into three groups: undergraduate teaching, graduate teaching and postgraduate teaching. Total registra-



tion in all these groups was 1,540 students. Some fifteen members of the Department of Anatomy with a rank of Lecturer or above, aided by two full-time demonstrators, three teaching fellows and many part-time personnel were responsible for the formal courses listed below. It will be noted that while certain courses were given to students of only one faculty or school, the registration in others includes students of several faculties. It is of interest that the Department of Anatomy, which might generally be thought to confine its activities solely to medical students, actually teaches undergraduate students from five different faculties or schools.

#### UNDERGRADUATE TRAINING

Plans are being made for a major revision in the teaching of medical students which will occur in 1969. Already some of the methods to be used then are being tried in this Department.

In the Division of Histology, preliminary experiments carried out during this year on the use of Student Seminars have brought forth a good deal of comment from the student body. The consensus appears to be that student-prepared and -delivered seminars in small groups should become an integral and expanded part of the undergraduate Histology Programme; the already reduced number of didactic lectures should be further reduced; and the policy of inviting clinical and investigative experts in specific fields related to Histology should be further encouraged.

#### FORMAL UNDERGRADUATE COURSES

##### *Gross Anatomy*

41	Biology and Medicine students, second year
30	Biology and Medicine students, third year
125	Dentistry students, first year
50	Dental Hygiene students, first year
166	Medical students, first year
5	joined by Art as Applied to Medicine
2	joined by Rehabilitation Medicine Teachers' Course
123	Rehabilitation Medicine students, first year
102	Rehabilitation Medicine students, second year
8	Speech Pathology and Audiology students
100	Physical and Health Education students, first year
79	Physical and Health Education students, second year

##### *Histology*

30	Biology and Medicine students, third year
166	Medical students, First year
5	joined by Art as Applied to Medicine students, first year
110	Rehabilitation Medicine students, first year

##### *Neuroanatomy*

174	Medical students, second year
8	joined by Speech Pathology and Audiology students
5	joined by Art as Applied to Medicine students
1,329	<i>Total in undergraduate Courses</i>

#### GRADUATE TRAINING

The Graduate Department of Anatomy is staffed by some of the individuals who are on the academic staff of the Undergraduate Department. These individuals conducted the formal courses listed below but also supervised the training of nine graduate students who were proceeding to advanced degrees. Three of these graduate students were proceeding to the Ph.D. degree and the other six to the M.Sc. degree. During the year three of the latter completed the requirements for their degrees.

*Formal Graduate Courses*

3	Gross Anatomy
9	Histology
10	Growth, Constitution and Evolution
12	Immunogenetics
6	Neuroanatomy
40	in Graduate Courses

## POSTGRADUATE TRAINING

The Department of Anatomy conducts a very active programme for graduates in the Health Sciences who are proceeding, not towards graduate degrees, but towards special diplomas or towards Certification or Fellowship in the Royal College of Physicians and Surgeons of Canada. The courses given are listed below.

*Formal Postgraduate Courses*

28	Rehabilitation Medicine Graduate students
16	Graduate Dental students
7	Residents in Surgery
3	joined by Residents in Therapeutic Radiology
13	Residents in Diagnostic Radiology
6	Residents in Anesthesia
5	Residents in Ophthalmology
25	Residents in Otolaryngology
30	Advanced Course in Surgery
16	Advanced Course in Obstetrics and Gynecology
22	Residents in Neurosurgery and Neurology
171	in Postgraduate Courses

In addition to the above courses the staff supervised three graduates in Medicine who were proceeding to the degree of B.Sc.(Med.) during the past academic year. One of these has already been awarded his degree.

## STAFF

It is with regret that we must report that Dr. S. H. Bensley has been forced by illness to withdraw from active participation in Departmental teaching and other functions. Her long association with the Department of Anatomy and her great service to it are gratefully acknowledged.

We record with pleasure the appointments to the staff in the past year of Dr. E. G. Bertram with the rank of Professor and of Dr. A. M. Jézéquel with the rank of Associate Professor. We look forward to the arrival, in September 1968, of Dr. V. I. Kalnins who has accepted an appointment at the rank of Assistant Professor.

Dr. B. Liebgott was promoted to Lecturer in July 1967 and Dr. S. McDaniel joined the staff as Lecturer in March 1968.

We acknowledge the continued very valuable contribution made to our teaching by numerous individuals who devote part of their time to Departmental duties. Their efforts make possible closer personal attention to the students and bring to the attention of the students practical clinical applications of the anatomical knowledge they are acquiring.

## RESEARCH

Most staff members conduct active research programmes, many of which provide graduate students with the materials, facilities and supervision necessary for them to proceed to advanced degrees.

Dr. A. A. Axelrad and his associates have been engaged in two research projects. The first, carried out in the Ontario Cancer Institute, is a continuation of the investigation into the mechanism of action of the single gene locus which determines



a difference of several orders of magnitude in the resistance or susceptibility of mice to infection by a leukemia virus (Friend). Evidence has been obtained that resistance against this heat-labile, membrane-enclosed RNA virus, or against the cells rendered leukemic by the virus, is not brought about by such host mechanisms as removal of virus by macrophages, elevation of body temperature, production of humoral antiviral antibody, interferon, or homograft reaction. Target cells for the virus, which were found in normal spleen and bone marrow, when exposed to Friend Virus *in vitro* and injected into supralethally irradiated mice, were shown to undergo leukemic transformation. This new experimental system for investigating the initiation of leukemia at the cellular level permitted the observation that the target cells themselves constitute an important site of action of the gene controlling susceptibility, or resistance, to Friend Leukemia Virus infection.

The second research project, carried out in the Department of Anatomy, is designed to throw light on the nature of the stem cells of a variety of mature mammalian tissues. These cells are ordinarily held in reserve and called on to proliferate under special circumstances as when tissue damage is followed by regeneration. A method has been devised for uniquely labelling these cells and studies are now in progress to investigate their properties and fate.

Dr. E. G. Bertram conducts research in two areas: (a) A Golgi study is being made of cortical connections in cat and man. The modified Golgi silver stain is used in a morphological study of the processes of cortical neurons to show how and where they terminate. The various types of connections in the different functional areas of the cerebral cortex are recorded. (b) The capillary neuronal relationship of blood vessels and nerve cells in the cerebral cortex of cat and man is under investigation. The modified Golgi technique is also used here to simultaneously stain blood vessels and neurons to show their relationships. It has been shown that there is a very close relationship between a small portion of the cell body of a neuron and the capillary wall, and that no neuroglial process or membrane comes between the cell body and capillary wall at this point. The exchange of gases and nutrients at this point could be directly from capillary to cell body.

Mrs. W. M. Brown in association with Dr. A. A. Axelrad has continued her studies which seek to identify those cells in the spleen of the normal C<sub>3</sub>H mouse that are transformed by the Friend Leukemia Virus.

Dr. D. H. Cormack used a quantitative method to determine the number of tumor cells that adhere to peritoneal mesothelium *in vitro*. An outer coating of acidic glycoprotein has been demonstrated on both the tumor cells and the mesothelium, and may be involved in the adhesion of tumor cells to serous membranes. Treatment of the tumor cells with the enzyme neuraminidase, which removes surface sialic acid without affecting cell viability, decreases the incidence of tumor takes. The incidence of tumors in tolerant and immunized hosts is being compared to determine whether neuraminidase also affects the antigenicity of the tumor cells.

Dr. J. W. A. Duckworth has conducted research into a wide variety of subjects: (a) in conjunction with Dr. N. Carroll he has been investigating the ossification of the clavicle with a view to finding out possible factors which might explain the etiology of congenital pseudoarthrosis of the clavicle. To date, all cases of this condition have occurred on the right side with the exception of one case which was on the left side, but in which complete transposition of the viscera was present. (b) In conjunction with Dr. W. M. Loughheed he has been working on the production of a model of the brain and its blood vessels which could be used in the training of neuro-surgeons in carrying out aneurysm ligations. For this purpose the model must be of approximately the same consistency as that of the normal brain with the blood vessels in their normal situations. The whole must then be fitted into the skull so that approaches can be made using a bone flap. A preliminary model has been completed and demonstrated at the meeting of the American Society of Neurosurgeons in Chicago. (c) He has also investigated the range of congenital heart malformations which are the result of abnormal torsion of the bulboventricular loop of the embryo-



nic human heart plus either normal or diminished reduction of the bulboventricular angle. In carrying out this investigation he used material available in the large collection at the Hospital for Sick Children. (d) He has examined the anatomy of the sacroiliac joints in relationship to the normal movements which occur at these joints. He has been invited to give a paper on this subject at the meeting of the International Association of Manipulative Surgeons in Salzburg in September 1968.

Dr. A. M. Jézéquel continued the study of the ultrastructural changes observed in human liver during infectious hepatitis. An ultrastructural and virological study of the liver and the kidney during infectious canine hepatitis undertaken in collaboration with Dr. K. Givan has been completed. It has shown that the replication of the virus in nuclei of liver cells can occur without prominent cytoplasmic changes. In the kidney, there is evidence for a replication of the virus in nuclei of mesangial cells. A new technique of enzymatic extraction on ultrathin sections has been applied to the study of infectious canine hepatitis virus.

The pathogenesis of fatty liver induced by tetracyclines has been investigated, with a combined morphological and biochemical approach. A disturbance in the metabolism of chylomicrons has been observed. It appears that, in the liver, there is no early inhibition of protein synthesis induced by tetracycline.

Dr. A. G. Erwin, in collaboration with Dr. J. S. Thompson, has continued his investigation into the behaviour of small portions of male mammary glands when they are implanted into the mammary fat pads of female mice. The donor tissue comes from three strains of mice, one in which the female has a low incidence of mammary cancer and two with markedly elevated incidence. A comparison is being made of the growth characteristics of the tissue when implanted into host mice that are hybrids between high and low incidence strains.

Dr. B. Liebgott has commenced a serial factor analysis study of craniofacial measurements of boys age 3 to 16. Using material collected in the Burlington Survey he has made measurements upon anteroposterior and lateral radiographs taken at yearly intervals from age 3 to 16 years on each boy in the series. The measurements for each age group will then be intercorrelated and the correlations subjected to factor analysis in an effort to provide a mathematical model to explain craniofacial growth.

Dr. R. B. MacKenzie has continued his study on the biomechanics of the spine and the manner in which the spinal nerves leave the cord and the spinal canal. This study has clinical applications in relation to anterior cervical discectomy and fusion.

He has also conducted research in two fields of particular interest to otolaryngologists. With Dr. Bruce Pearson of the Department of Otolaryngology he has studied the surgical anatomy of the third part of the maxillary artery with particular reference to the treatment of posterior nasal epistaxis. He has also continued his studies on the cricopharyngeus muscle and the origin of pharyngeal diverticula.

Finally he has directed research into the detailed anatomy of the lacrimal sac and canaliculi and their relationship to the angular vein.

Dr. K. O. McCuaig has continued his analysis of the physical growth and development of adolescent boys in an attempt to develop better ways of predicting the onset and duration of the growth spurt. This problem is of particular interest to clinical orthodontists.

Dr. D. L. McLeod has been engaged in the development of a system for the cultivation of hemopoietic cells *in vitro*. This system is being used to study the differentiation of bone marrow and spleen cells obtained from healthy mice and from mice infected with Friend leukemic virus.

Preliminary studies indicate that cells of spleen and bone marrow from Friend infected mice, when plated in soft agar on feeder layer of mouse kidney tubules and in conditioned media, will produce clones of cells. Experiments, designed to show that these clones are produced by single cells which have been transformed by leukemic virus, and to study the differentiation of these cells *in vitro*, are now underway.

Dr. McLeod, Mr. Andre Hui and Dr. A. W. Ham presented a demonstration



to show the production of several features of the runting syndrome in newborn mice by phenylhydrazine anemia at the Annual Meeting of the American Association of Anatomists in April 1968, Tulane University, School of Medicine.

Mrs. P. Rodney has commenced, in collaboration with Dr. R. G. MacKenzie, a study of the blood supply to the nasopharynx and the pterygopalatine fossa.

Dr. C. G. Smith has continued his studies on the distribution of the nutrient arteries within the pons and has extended it to include the venous drainage of the same area.

Dr. J. S. Thompson has developed a dietary method of producing atheroma in the wall of the ascending aorta in inbred strains of mice. The fact that the atheromata appear in 100 per cent of animals by the age of ten weeks and are always to be found in a very restricted area make the mouse appear to be an excellent animal for further studies, especially those involving the effect of heredity upon the susceptibility to atheromata.

#### HONOURS

DR. E. G. BERTRAM (together with Dr. M. L. Barr) has been awarded the Maurice Goldblatt Cytology Award by the Third International Congress of Cytologists at their meeting in Rio de Janeiro, May 21, 1968.

DR. A. A. AXELRAD has been appointed to the Research Advisory Group of the National Cancer Institute of Canada.

#### SCHOLARLY ADDRESSES

DR. A. A. AXELRAD. "Quantitative Studies on Friend Leukemia Virus and its Interaction with the Host Cells." St. Jude Children's Research Hospital, Memphis, Tennessee. "Genetic Control of Susceptibility and Resistance to Friend Leukemia Virus." Canadian Cancer Conference, Honey Harbor, June 1968.

DR. E. G. BERTRAM (with Dr. M. L. Barr). "Cytologic and Cytogenetic Aspects of the X Chromosome of Man." Third International Congress of Cytologists, Rio de Janeiro, May 21, 1968.

DR. A. G. ERWIN. "The Thorax." Canadian Association of Physiotherapists, Toronto, April, 1968.

MISS M. HARLAND. "Stabilizing Mechanisms of the Knee Joint." Postgraduate Course, Physical Therapists, University of Toronto, November 18, 1967.

DR. A. M. JÉZÉQUEL. "Analysis of the effects of ethionine on the liver." International Symposium of Liver and Endocrines, Paris, October, 1967. "The effects of Tetracycline on protein synthesis in vivo." Department of Pathology, University of Pittsburgh School of Medicine, March, 1968. "Ultrastructural studies of cell-virus interactions." Department of Biology, Oakland University, Rochester (Mich.), March, 1968. "Ultrastructural features of fatty liver induced by Tetracyclines." Department of Pathology, Mount Sinai School of Medicine, New York (N.Y.), April, 1968.

MRS. P. RODNEY. "The Development of the Conduction System in the Heart of the Golden Hamster." Canadian Federation of Biological Sciences, June, 1968.

DR. J. S. THOMPSON. "Genetic Control of Arterial Patterns." Canadian Federation of Biological Sciences, Montreal, July, 1967. "Atherosclerosis in Inbred Strains of Mice." American Association of Anatomists, New Orleans, April, 1968.

#### PUBLICATIONS

BERTRAM, E. G. "Recurrent Collaterals in the Cerebral Cortex of Cat and Man" (*Anatomical Record*, vol. 160, no. 2, Feb. 1968, p. 507).

JÉZÉQUEL, A. M. (with GIVAN, K., and TURNBULL, C.) "Pepsin Digestion of Virus Particles in Canine Hepatitis using Epon-Embedded Material" (*Journal of Histochemistry and Cytochemistry*, vol. 15, 1967, p. 688).

JÉZÉQUEL, A. M., SIOMRA, S., and BORDOLUCCI, B. "Studies on Fatty Liver Induced by Tetracycline" (*Federation Proceedings*, vol. 27, no. 2, 1968, p. 665).

JÉZÉQUEL, A. M., and STEINER, J. W. "A Propos of the 'Presence of Virus-like Bodies in Liver



Cells of Patients with Infectious Hepatitis' " (*Journal of Clinical Pathology*, vol. 20, 1967, p. 788).

——— "Electron Microscopy of Liver Biopsies and of Transmissible Agents from Hepatitis Patients" (*Tijdschrift voor Gastroenterologie*, vol. 10b, supp., *Liver Research*, ed. J. Vandenbroucke *et al.*, 1967, p. 3).

THOMPSON, J. S. "Atherosclerosis in Inbred Strains of Mice" (*Anatomical Record*, vol. 160, no. 2, Feb. 1968, p. 440) (abstract).

——— Reviews, *Canadian Journal of Genetics and Cytology*, vol. 9, Dec. 1967, p. 894; *Medical Post*, March 26, 1968, pp. 14–15.

THOMPSON, J. S., McLAUGHLIN, P. R., and HESLIN, D. J. "Impaired Pronation-Supination of the Forearm; an Inherited Condition" (*Journal of Medical Genetics*, vol. 5, no. 1, March 1968, pp. 48–51).

THOMPSON, J. S., and THOMPSON, M. W. "The Problem of Intersex" (*Journal of the American Medical Women's Association*, vol. 22, no. 11, Nov. 1967, pp. 827–35).

## ART AS APPLIED TO MEDICINE

*Under the direction of Professor Nancy Joy*

The degree of Bachelor of Science, Art as Applied to Medicine, was conferred for the first time at the 1968 Commencement on June 10. Enrolment in the 1967–68 session was at an all time high with 11 regular and two part-time special students.

A class in English which was added to the 1967–68 curriculum has amply justified the expectation that it would benefit the students' total outlook and has in fact improved their ability to discriminate between technical competence and the quality of content. Moreover, it has proved an unexpected asset in providing a second dimension with which to assess individual student's patterns and habits of thinking which have a similar influence, for either good or bad, on their writing and painting.

Mr. John Kozie has been appointed an Associate, to teach the principles of photography and the projection or duplication of copy, as they relate to Audio Visual Communication in medicine. The construction of a photographic workshop-darkroom etc., which will be required for practical demonstration and for the preparation of teaching material, has been approved.

Mr. Robert Demarest, Medical Illustrator to the College of Physicians and Surgeons, New York, spent a week in the Department as Visiting Lecturer. Mr. Demarest was the guest of honour at the Department's Open House in March, for which 1,000 invitations were sent to faculty members, students and staff of art schools and others, including the press, who were exceedingly kind in the excellent reports made later over the news media. On the invitation of Dr. Norrie Swanson, Mr. Demarest gave a lecture titled "Changes in Design and Style of Medical Illustration Created by the New Teaching Media" to a group of doctors and other interested persons at the Toronto General Hospital.

In April, Miss Margot Mackay gave a preparatory lecture on printing methods and conducted a field trip for staff and students to Rolph-Clark-Stone Ltd., Lithographers. Miss Mackay and Mrs. Bridget Hough attended the Association of Medical Illustrators meeting in San Francisco in October. Miss Nancy Joy's report as Chairman of the Bibliography Committee was read at this meeting by Mrs. Edith Tagrin. Miss Joy was reappointed as Chairman for 1967–68.

The secretarial section of the Department has handled, in addition to telephone enquiries about the profession of medical illustration, more than 250 enquiries by mail. These include many from vocational guidance teachers, and about two dozen from students who may qualify or who hope to qualify over the next few years. About three-fifths of the enquiries are from the United States and half of the remainder are from outside Ontario.

### AAM SERVICE DIVISION

The work load of the Service Division, which over the past five years has been increasing at about twenty per cent per annum, this year increased by almost one



hundred per cent. In excess of eight hundred graphs, charts and tables were prepared for lectures and publications. In addition, a display of 15 (40" × 60") cards of statistical data was prepared for Dr. Jan Steiner. Considerably more than 150 drawings of medical subjects were completed. Four exhibits totaling approximately 50 feet of wall space were prepared for medical meetings. Students and staff covered approximately 125 feet of wall to display current work for the Department's Open House in March.

Under the direction of Dr. Norrie Swanson, Mrs. Hough and Mr. John Kozie worked with Dr. N. T. McPhedran to prepare a simple prototype video-taped lecture using art and typography. All the participants recorded the time they spent in preparation. Mrs. Hough also prepared illustrations for a new edition of the *Laboratory Outline in Physiology*, edited by Dr. R. E. Haist and Dr. L. W. Organ.

Copies of a movie, titled "Trans-sphenoidal Hypophysectomy," with explanatory illustrations prepared by Miss Blackstock for Dr. T. D. R. Briant, the editing of which was supervised by the AAM Department and the copyright of which is owned by the Governors of the University, has been requested by Smith, Miller and Patch (Canada) Ltd. for inclusion in their loan collection of films.

A series of lecture seminars under the direction of Miss Joy on methods of graphic presentation of numerical data has been initiated for the benefit of all staff and students working in the Department.

The medical departments which have made most use of the AAM service during the first ten months of the 1967-68 session are Physiology, Biochemistry, Pathology, Anatomy, Pharmacology, Cardiovascular, Ophthalmology, Otolaryngology and Medicine with from six to twenty individual requests from each. Thirteen other departments made one to four individual requests making a total of approximately one hundred and twenty job requests from University Departments and an equal number were made by staff of the teaching hospitals.

## BACTERIOLOGY

*Under the direction of Professor Philip Greey*

Prof. Greey retires June 30, 1968. Dr. A. E. Franklin has been asked to serve as Acting Head of the Department.

Dr. Sheila McDonald, at Sunnybrook Hospital, has been appointed Assistant Professor (part-time). The same rank is also held by Dr. Peter Fleming, Hospital for Sick Children, and Dr. W. D. Leers, Wellesley Hospital.

## RESEARCH

Dr. R. C. French and M. Barrens have studied the effect of superinfection by  $T_4r^+$  on the desoxyribonucleases of *Escherichia coli* Y10 ( $\lambda$ ). Adsorption of  $T_4r^+$ , or uv  $T_4r^+$  phage to the bacteria, during the first twenty minutes after the induction of the cells by ultraviolet light, leads to a rapid increase in free intracellular desoxyribonuclease, the exclusion of lambda replication and infection of the bacteria with  $T_4$ . An increase in free intracellular DNase also occurs by 40 to 60 minutes after primary uv induction of Y10 ( $\lambda$ ) cells. The increase in DNase is correlated with either the exclusion of lambda by  $T_4$ , or the exclusion of  $T_4$  by lambda, depending on the experimental conditions. The experiments lend strong support to the idea that intracellular DNases participate in exclusion mechanisms.

Dr. A. E. Franklin and Dr. D. A. Gordon are continuing their studies at the Rheumatic Disease Unit of the Wellesley Hospital relating to tissue culture studies of specimens from patients with rheumatoid arthritis. All synovial fluids and biopsy specimens have been tested for the presence of fungi, aerobic and anaerobic bacteria, mycoplasma and viruses. Occasionally agents have been isolated but no consistent



pattern is evident. A transmissible agent has been demonstrated in approximately half of the synovial fluid specimens obtained from rheumatoid patients, and a cytopathogenic effect can be observed for as many as nine serial passages. Preliminary experiments have shown that human group O red blood cells can be adsorbed to tissue cultures inoculated with some rheumatoid arthritis specimens but not from those with osteoarthritis. Haemagglutination studies with supernatant fluids from these cultures were negative. Staining of inoculated tissue cultures with neutral red to visualize lysosomes indicated that there was an increase in the number of lysosomes but the significance of this observation is not clear. Inoculated tissue cultures, synovial fluids and homogenates of biopsy specimens were ultracentrifuged and the resultant pellets washed to remove globulins. Studies are now in progress to see if there is any enhanced cytopathogenicity, haemadsorption or haemagglutination with these ultracentrifuged deposits.

Dr. Franklin has also been in charge of the Viral Diagnostic Laboratory at the Hospital for Sick Children during the past year.

Dr. Peter Tuffnell, Toronto General Hospital, has found that Doxycycline, a tetracycline antibiotic, does not reach high concentrations for long periods in patients with anuria. This finding will be studied further this summer. He has also studied with Dr. Easterbrook, Department of Ophthalmology, the problem of disinfecting artificial eyes.

Dr. G. H. Hawks, at St. Michael's Hospital, is studying the value of fluorescent staining as a screening procedure for Myco. tuberculosis, and is engaged in a clinical investigation of oxolinic acid in the treatment of acute pyelonephritis.

Dr. Peter Fleming, at the Hospital for Sick Children, has completed a study of the cephalosporins and the purification of cephalosporinase. He is continuing a study on the value of ampicillin in acute purulent meningitis.

Dr. W. D. Leers, at the Wellesley Hospital, has instituted the first infections control nurse as a liaison between the laboratory and the clinician. He is interested and working on the epidemiology and control of hospital infections. His other field of research deals with reoviruses.

Dr. Ian Duncan and Dr. Sheila McDonald, at Sunnybrook Hospital, are investigating the epidemiology of *Pseudomonas* infections and the classification and pathogenicity of atypical members of the enterobacteriaceae.

Miss Joan Hennessy is studying the effect of antimicrobial agents on twelve lines of tissue culture cells, contaminated with mycoplasmas. Seven antibiotics have been used extensively – Kanamycin, Tetracycline, Novobiocin, Lincomycin, Gentamycin, Tylosin and Myochrysine (sodium aurothiomalate). Novobiocin and Lincomycin treatment, alone or followed by eighteen hours incubation of the cells at 41°C., have proved most successful in eradicating mycoplasma from the tissue culture cells. Several cell lines are still free of mycoplasma six months after treatment.

Mycoplasma-free cell lines have been used in attempts to isolate a viral or other agent from patients with cat scratch disease. Transmissible cytopathogenic effects have been obtained from lymph node material from five patients. Attempts to demonstrate neutralizing antibody in convalescent sera, and antigen-antibody reaction by agar gel diffusion have been negative so far. Other methods of antigen-antibody testing are being studied.

With the co-operation of the hospital bacteriologists and the Department of Pathology, supplies of teaching material needed for second-year medical Bacteriology are being expanded to meet future requirements.

Dr. J. C. Sinclair and Miss B. K. Buchner, M.A., are continuing to study infectious hepatitis in collaboration with Professor Deinhardt, Chairman, Department of Microbiology, Presbyterian-St. Luke's Hospital, Chicago. Drs. Deinhardt and Holmes have reported that the marmoset may be a possible experimental host for human viral hepatitis. In co-operation with Dr. Deinhardt, the Toronto group is conducting tissue culture studies of specimens from marmosets previously inoculated in Chicago with viral hepatitis sera.



## HONOURS

DR. I. B. R. DUNCAN has been re-appointed to the speciality committee in Microbiology with the Royal College of Physicians and Surgeons of Canada.

## SCHOLARLY ADDRESSES

DR. W. D. LEERS presented the following paper before the Canadian Society of Microbiologists at Windsor, Ontario, on June 3, 1968: "An Unusual Case of Suppurative Thyroiditis Caused by *Actinomyces naeslundii*."

DR. I. B. R. DUNCAN addressed the Seventh Interscience Conference on Antimicrobial Agents and Chemotherapy in Chicago in October, 1967, on the subject "Development of Lincomycin Resistance by Staphylococci." Dr. Duncan also addressed the Canadian Society of Microbiologists in Windsor, Ontario, in June, 1968, on "Comparative Studies of North American and European Strains of Echovirus type 30."

## PUBLICATIONS

DUNCAN, I. B. R. "Virology in a General Hospital" (*Canadian Medical Association Journal*, vol. 98, no. 22, June 1, 1968, pp. 1050-6).

FLEMING, P. C. "The Nephrotoxicity of Cephaloridin in Rabbits and Man" (*Applied Therapeutics*, vol. 9, 1967, p. 948).

FLEMING, P. C., *et al.* "Characteristics of *Aerobacter* beta-lactamase" (*Canadian Journal of Microbiology*, vol. 14, no. 2, Feb. 1968, pp. 139-45).

—— "Febrile Mucocutaneous Syndrome with Respiratory Involvement Associated with Isolation of *Mycoplasma pneumoniae*" (*Canadian Medical Association Journal*, vol. 97, no. 24, Dec. 9, 1967, pp. 1458-9).

LEERS, W. D., ROZEE, K. R., and WARDLAW, A. C. "Immunodiffusion and Immunoelectrophoretic Studies of Reovirus Antigens" (*Canadian Journal of Microbiology*, vol. 14, no. 2, Feb. 1968, pp. 161-4).

TUFFNELL, P. G., and GREEN, R. N. "Laboratory Acquired Melioidosis" (*American Journal of Medicine*, vol. 44, no. 4, pp. 599-605).

## BANTING AND BEST DEPARTMENT OF MEDICAL RESEARCH

*Reported by Professor D. W. Clarke, Acting Director*

In Professor D. W. Clarke's section work has continued on studies of the effect of serum from persons suffering from multiple sclerosis on slices of the cerebral cortex of rats. Studies have also been undertaken to develop a suitable bioassay for small quantities of glucagon.

In Professor G. A. Wrenshall's section the year has been noteworthy for the accumulation of many new data through research done in collaboration with Professor M. Vranic, Professor G. Hetenyi, Professor J. K. Davidson and others. Concurrent rates of gluconeogenesis and of nitrogen excretion in fasting normal and depancreatized dogs have been determined. Studies are proceeding of the effect in the depancreatized dog of maintaining an adequate basal rate of insulin infusion on the rate of gluconeogenesis during running. New experiments have been made on the absolute rate of absorption of a stomach-fed meal of glucose in the resting dog.

Professor C. C. Lucas and Dr. Jessie H. Ridout, with the technical assistance of Mr. G. L. Lumchick, studied further the ability of different dietary proteins to protect rats against the inebriating effects of alcohol as well as against the liver damage usually attributed to it. Purified diets differing primarily in the kind and amount of protein were fed. In several groups extra choline was added. The rats drank 10 per cent v/v ethanol in place of drinking water and four times per week were force-fed 40 per cent v/v ethanol. This caused moderate to severe intoxication in rats fed low levels (6%) of a good mixture of dietary proteins, and also in those fed 9 per cent of potato or milk proteins. In rats fed diets with added choline and



good quality protein (9 per cent, from mixed animal and plant sources) there was no more fat in the livers of the alcohol-treated rats after 10 months on this regimen than in those of controls drinking water. Protection against intoxication was greatly improved when the level of dietary protein was increased from 6 to 9 per cent; at the latter level, a mixture from six plant sources was almost as effective as one including animal proteins.

In Professor J. Logothetopoulos' section, regeneration of the islet-cells has been studied by autoradiography. Experimental diabetes was induced in the mouse and the guinea pig by streptozotocin. The evolution of the islet-cell lesions was followed by electron microscopy. In collaboration with Dr. Suzette Stuart aspects of lipid metabolism in the diabetic state are being pursued.

In Professor S. Mookerjee's laboratory, investigation on the mechanism of fatty liver development due to feeding of an acute intoxicating dose of ethanol has been initiated. Evidence shows a decreased incorporation of glucosamine-1-<sup>14</sup>C into proteins of plasma and of liver microsomal membranes in ethanol-fed rats. These studies suggest that alcohol intoxication, like early choline deficiency, causes a defect in the protein or secretion of plasma low density lipoprotein. In collaboration with Dr. C. E. Park, studies on fatty acid composition of individual lipids extracted from low and high density plasma lipoproteins in different phases of choline deficiency are in progress.

In Professor A. Kuksis' section studies have continued on the chemical structure and metabolism of complex natural lipids by thin-layer, gas-liquid and gas-liquid radiochromatography. Further applications of the combined methods were made in determination of fatty acid interaction during fat absorption, and triglyceride and phospholipid synthesis by rat intestinal mucosa (in collaboration with Dr. W. C. Breckenridge); in determination of the structure of the molecular species of lecithins in erythrocytes and surrounding plasma of man and rat, and in plasma and other specialized tissues of rat (in collaboration with Mr. L. Marai); in determination of the molecular species of natural phosphatidyl ethanolamines and in assessing their metabolic relationship to other diglyceride phosphatides (in collaboration with Mr. B. Holub); in studies of the resolution of egg yolk lipoproteins by thin-layer chromatography on hydroxylapatite (in collaboration with Mr. D. A. Gornall); in studies on the effect of intravenously administered plant sterols on cholesterol metabolism and bile acid formation by the rat (in collaboration with Mr. M. T. Subbiah). The determination of total plasma lipids by direct gas chromatography has been improved by predigesting the total lipid mixture with phospholipase C prior to the analysis.

Dr. Nina Morley measured antibody to bovine insulin in the serum of adult immune guinea pigs and of their neonatal offspring by an immunosorbent method. Anti-insulin levels declined rapidly from the day of birth in the young while increasing in the mother guinea pigs.

Mr. C. R. Cowan has completed the design of a continuous intra-arterial injection instrument, the "Conjector," for the chemotherapeutic treatment of ambulatory cancer patients. The capacity has been increased to 10 cc/24 hours. A limited number of these "Conjectors" have been sold and the University has applied for Canadian and American patents. Mr. Cowan has also collaborated with Dr. R. L. MacMillan in a study of red cell stickiness in specimens of blood from patients of the Coronary Unit, Toronto General Hospital. This phenomena has been recorded on moving picture film and a comparison made with blood specimens procured from normal healthy individuals.

In Professor A. A. Horner's laboratory a heparin-peptide complex of very high molecular weight has been isolated from rat skin and is being characterized. It is resistant to proteolytic digestion but is depolymerized by ascorbic acid under very mild conditions. A study of the possible physiological significance of the ascorbic acid reaction is planned. Mr. R. G. Holmes is studying heparin from mast cells, which are assumed to synthesize heparin. In view of the unexpectedly large species and tissue



differences in heparin structure recently observed in this laboratory, a project to characterize heparin from human tissues is in progress.

Research in Professor C. C. Yip's section has been continued in two major areas: a) the biosynthesis of the thyroid hormone, thyroxine, and b) the biosynthesis of insulin. The purified thyroid peroxidase involved in the iodination of tyrosine, an intermediate step in the biosynthesis of thyroxine, was used to immunize guinea pigs and the antibodies thus obtained are being used to locate the cellular site of iodination in the thyroid cells. The action of thyroid stimulating hormone (TSH) on the enzymic iodinating activity of the rat thyroid gland has been investigated by Mr. A. E. Zimmerman. It is concluded that TSH is necessary to maintain the iodinating enzyme activity in normal animals and that it stimulates this enzyme activity in hypophysectomized animals or in animals receiving replacement dose of thyroxine. Mr. Zimmerman has also begun his investigation on the receptor site of TSH in the thyroid. A colony of mice bearing a TSH-producing tumor has been established and attempts are being made to prepare  $^3\text{H}$ -labelled TSH from these animals. The radioactive hormone will be used as a tracer for the location of such a receptor site. In the studies on the biosynthesis of insulin, Mr. A. Tung has been able to show that a single-chain "proinsulin" is synthesized in fetal bovine pancreatic slices whereas insulin apparently is not actively synthesized. On the other hand, both "proinsulin" and insulin are synthesized by pancreatic slices from new-born calves. Various factors affecting the biosynthesis of this insulin precursor and its conversion to insulin are being studied. Concurrent with this investigation is the demonstration that a "proinsulin" is present in different lots of crystalline beef insulin and can be obtained in small quantities from crystalline insulin. Some of the chemical and physical properties of this "proinsulin" have been studied and its biological and immunological properties are being investigated. A by-product of this research is the preparation of pure insulin which is free of contaminating materials present in crystalline insulin preparations.

Professor B. S. Leibel, in collaboration with Professor E. Llewellyn Thomas and Dr. Michael Albisser, Department of Biomedical Electronics, is working on the extracorporeal automated and continuous regulation of blood sugar and serum electrolytes. A new repeated impulse type of intravenous glucose tolerance test is being evolved.

Dr. W. J. Linghorne has extended his studies concerning the nature of the osteogenic process, particularly with respect to bone repair.

Dr. Bruno Rosenfeld has explored the effects of the nature of dietary carbohydrates on the level of hepatic long chain fatty acid synthetase, a key operative in lipogenesis. When corn-starch, as a source of carbohydrate in a complete diet, is replaced by sucrose in a diet fed to rats, both the specific activity of the long chain fatty acid synthetase and the amount of enzyme per liver increased several fold, as did the triglyceride fraction in the particulate lipid of the liver parenchyma. Fructose in the same semi-synthetic diet showed the same effects as sucrose both on enzyme and on hepatic triglycerides. Glucose did not produce an increase of the fatty acid synthetase or liver triglyceride comparable to that of sucrose or fructose. It was concluded that the stimulating effect of dietary sucrose on long chain fatty acid synthetase and on hepatic triglyceride is due to its fructose moiety.

In the Subdepartment of Synthetic Chemistry the synthesis of phospholipids and phosphonolipids of biological interest was continued by Professor E. Baer and his colleagues, Dr. H. Basu (phosphonic acid analogues of cephalins, glycolcephalins, phosphatidic acids and glycerol- $\alpha$ -phosphate), Dr. D. J. Nazir (phosphonic acid analogues of phosphatidyl- $\beta$ -methylcholine), Dr. S. K. Pavanaram (phosphonic acid analogues of N-monomethylcephalin and phosphatidylserine), Dr. R. Robinson (phosphonolipid metabolites and phosphonic acid analogues of glycollecithins and glyceraldehyde-3-phosphate), Dr. G. R. Sarma (phosphonolipid metabolites, ceramide aminoethylphosphonates), and Dr. D. Buchnea (propylene glycol phospholipids, acyl migration). The members of the staff were ably assisted in their work by Mr. H. Flehmig.



Professor W. R. Franks, with the assistance of Miss M. Shaw, Mr. G. Meek and Mr. J. Skublics has continued his work on tumour-bearing animals. Further studies on lactic acid levels in various tissues after death under different circumstances are also being pursued.

Mr. K. R. Bowler, Administrative Assistant in the Department, has continued to give invaluable and capable service in dealing with the complex management of all sections housed in the Charles H. Best Institute.

#### SCHOLARLY ADDRESSES

PROFESSOR A. KUKSIS, on "Bile Acid Composition of Perfused Liver Bile of Normal and Choline Deficient Rats" (co-author), on "Molecular Species of Lecithins in Plasma and Erythrocytes of Man" (co-author), on "Specific Distribution of Short Chain Fatty Acids in Bovine Milk Fat" (co-author) to the 10th Annual Meeting of the Canadian Federation of Biological Societies, McGill University; on "Quantitative Gas Chromatography in the Structural Characterization of Glyceryl Phosphatides" and on "Analysis of Bile Acids" to the American Oil Chemists' Society Short Course, Rice University; on "Triglyceride Composition of Milk Fat" to the Special Dairy Industry Board Symposium, Chicago; on "Plasma Lipids of Young Adults on Controlled Experimental Diets" (co-author) and on "Gas-liquid Radiochromatography of Intact Natural Triglycerides" (co-author) to the joint meeting of the American Oil Chemists' Society and the American Association of Cereal Chemists, Washington.

PROFESSOR S. MOOKERJEA, on "Fatty Liver" at Symposium organized by the Department of Medicine, University of Tokyo and Hoechst Pharmaceuticals, Tokyo, Japan; on "Lipoproteins and Fatty Liver" in Nutrition Research Laboratories, Indian Council of Medical Research, Hyderabad, India; on "Lipoproteins and Fatty Liver" in the Physiology Department, Calcutta University, Calcutta, India (under the auspices of the Physiological Society of India); lecture to the members of the Department of Biochemistry, Nagpur University, Nagpur, India; on "Mechanism of Fatty Liver in Choline Deficiency" at the Institute of Child Health, Calcutta, India; on "Impairment of Glycoprotein Synthesis in Choline Deficient Rats" to the Glycosaminoglycan-Glycoprotein Group at the State University of New York, Buffalo; lecture at the Federation of American Societies of Experimental Biology, Atlantic City, New Jersey.

DR. C. E. PARK, on "Mitochondrial Lipids of ELD Ascites Tumor Cells" to the American Association for Cancer Research, Atlantic City, New Jersey.

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- BAER, E., and BASU, H. "Phosphonolipids XVI. An Alternative Method for the Synthesis of Phosphonic Acid Analogues of L- $\alpha$ -Cephalins" (*Canadian Journal of Biochemistry*, vol. 46, 1968, p. 351).
- BAER, E., BASU, H., and PAL, B. C. "Phosphonolipids X. A New Synthesis of Phosphonic Acid Analogues of L- $\alpha$ -Cephalins" (*Canadian Journal of Biochemistry*, vol. 45, 1967, p. 1467).
- BAER, E., DUKE, A. J., and BUCHNEA, D. "Synthesis of Propylene Glycol Phospholipids: Analogues of L- $\alpha$ -Lecithins and L- $\alpha$ -Cephalins" (*Canadian Journal of Biochemistry*, vol. 46, 1968, p. 69).
- BAER, E., and PAL, B. C. "Phosphonolipids XIII. Synthesis of Dihydroceramide Aminoethylphosphonates" (*Canadian Journal of Biochemistry*, vol. 45, 1967, p. 1478).
- "Phosphonolipids XV. Synthesis of Dihydroceramide Aminoethylphosphonate" (*Canadian Journal of Physiology and Pharmacology*, vol. 46, May 1968, pp. 525-32).
- BAER, E., and ROBINSON, R. "Phosphonolipids XI. Synthesis of Phosphonolipid Metabolites. L- $\alpha$ -Glyceryl-(2-trimethyl-ammoniummethyl)phosphonate" (*Canadian Journal of Biochemistry*, vol. 45, 1967, p. 1747).
- BAER, E., and SARMA, G. R. "Phosphonolipids XII. Synthesis of Phosphonolipid Metabolites. L- $\alpha$ -Glyceryl-(2-aminoethyl)-phosphonate" (*Canadian Journal of Biochemistry*, vol. 45, 1967, p. 1755).
- BAER, E., SARMA, G. R., ROBINSON, R., and SASTRY, P. S. "Phosphonolipids XIV. Detection and Identification of Glycerolphosphonolipids in the Presence of their Phospholipid Analogues by Paper Chromatography of their Saponification Products" (*Canadian Journal of Biochemistry*, vol. 45, 1967, p. 1783).



- BROSKY, G., and LOGOTHETOPOULOS, J. "Streptozotocin-Induced Diabetes in the Mouse and Guinea Pig" (*Federation Proceedings*, vol. 27, no. 2, April 1968, abstr. 1860, p. 547).
- CLARKE, D. W., and GITTENS, B. "The Effect of Serum from Multiple Sclerosis Patients on the Free Fatty Acids Output of Rat Brain Slices" (*Canadian Journal of Physiology and Pharmacology*, vol. 46, May 1968, pp. 507-9).
- HETENYI, G., JR., and WRENSHALL, G. A. "Adaptive Changes in Rates of Appearance and Disappearance of Glucose in Dogs following Step Changes in the Rate of Glucose Infusion" (*Canadian Journal of Physiology and Pharmacology*, vol. 46, no. 5, May 1968, pp. 391-8).
- KUKSIS, A. "Gas Chromatography of Neutral Glycerides"; in *Lipid Chromatographic Analysis*, ed. G. V. Marinetti, vol. 1, pp. 239-337. New York: Marcel Dekker, Inc., 1967.
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BIOCHEMISTRY

Under the direction of Professor G. E. Connell

During the year 609 students have received instruction in the Department of Biochemistry, the distribution being as follows:

Faculty of Medicine (first professional year)	166
Faculty of Dentistry (first professional year)	124
Faculty of Arts & Science (third year: Honours courses)	56
(fourth year: Honours courses)	33
Graduates enrolled as Special Students in the Faculty of Arts & Science	53
Faculty of Food Sciences (third year)	22
(fourth year)	4
(special students)	3
School of Graduate Studies	148
(a) Major Subject Biochemistry	49
Post-doctoral Fellows	4
Candidates for Ph.D.	23
Candidates for M.Sc.	22
(b) From other Departments	74
(c) Special Students	25
TOTAL	609

Among the graduate students majoring in Biochemistry, 2 held Fellowships of the Medical Research Council, 14 held Scholarships of the National Research Council, 9 held Province of Ontario Graduate Fellowships and 2 held Fellowships of the University of Toronto; 26 graduate students were granted Teaching Fellowships by the Department.

The following students registered in the Department of Biochemistry, completed work and presented theses for graduate degrees as follows:

*Ph.D. degree*  
STUART, MRS. S. C.  
"Metabolic Studies on Rat Liver Mitochondria"

*M.Sc. degree*  
BRONSKILL, MRS. P. M.  
"Ribosome-bound  $\beta$ -galactosidase in Escherichia coli"

BURROWES, C.  
"Chemical Modification of Acetylcholinesterase and Chymotrypsin"

CORKUM, T. P.  
"Purification of Human Chorionic Gonadotrophin Using an Immunological Assay Technique"

DIXON, Miss J. W.  
"Studies on the Active Site of Chymotrypsin"

LAVERS, MRS. B. H.  
"Liver and Tumor Lipid Composition in Mice Bearing Extra-hepatic Tumors"

LUKS, MRS. C.  
"Aggregation of an Immunoglobulin Fragment by Sulphydryl Oxidation"

MUSTARD, MRS. M. D.  
"A Physiological Study of Amino Acyl Transfer RNA in Escherichia coli"

OTTAWAY, C. A.  
"Conformational Studies of Systems Involving Lipoamide Dehydrogenase"



PARKES, J. G.

"Some Properties of Outer and Inner Membranes of Guinea Pig Liver Mitochondria"

STEEN, MISS L.

"The Properties of a Pathological Immunoglobulin"

*B.Sc. (Med.) degree*

GLADSTONE, R. M.

"Protein Synthesis: The Incorporation of L-Leucine-1-C<sup>14</sup> into Bovine Retina"

Professor Charles S. Hanes retired from the Department at the end of the academic year and became Professor Emeritus. Professor Hanes served on the staff with great distinction for seventeen years and he held the office of Chairman from 1959 to 1965. Professor G. R. Williams was on sabbatical leave in Sydney, Australia, during 1967-68. Dr. R. K. Murray and Dr. H. Schachter will return to the department in the coming academic year after extended leaves of absence. Dr. B. G. Lane will take up a new appointment on July 1, 1968. Professor T. Hofmann served as President of the Toronto Biochemical and Biophysical Society. Professor G. E. Connell continued as a member of the Medical Research Council and chaired a planning committee of the Council on the use of Anti-lymphocyte Serum in Canada.

The Department received invaluable assistance during the year in its undergraduate teaching programme from several honorary staff members who hold their major appointments in other departments: Dr. R. C. Burgess, Dr. A. Kuksis, Dr. J. A. Lowden, Dr. Mario Moscarello, Dr. I. Menon, Dr. A. Sass-Kortsak.

#### RESEARCH

Members of the Department have received generous grants from the Medical Research Council, the National Research Council, the J. P. Bickell Foundation, and the University of Toronto Cancer Research Committee.

In Professor Anwar's laboratory, studies on the structure of elastin have continued. A number of desmosine and isodesmosine-containing fractions have been isolated and their composition studied. As a part of a study of the biosynthesis of desmosine and isodesmosine, Mr. N. Davis is working on the chemical synthesis of these amino acids. A study of the specificity of purified elastase using insulin chains A and B has been completed. Mr. K. G. Gunetileke has completely separated the two enzymes (transferase and reductase) which catalyse the biosynthesis of UDP-Mur NAc and has studied the properties of the transferase in detail. Mr. A. Taku is working on the reductase. Miss J. Oliver has investigated the pathway for the biosynthesis of UDP-Mur NAc in a number of micro-organisms.

In Dr. Connell's laboratory Dr. A. F. Lewis and Mrs. C. Luks completed the characterization of some unusual immunoglobulins. Miss D. Parr and Mrs. B. Buchwald have taken up some new problems arising out of these studies. Dr. A. Bennick has refined his electrophoretic methods for the purification of salivary protein. Mrs. E. Adamson has developed a method for the purification of the enzyme gamma glutamyl lactamase from liver tissue. Mr. F. Ofosu has worked on the characterization of enzymatic fragments of human haptoglobin.

In Professor J. Manery Fisher's laboratory, research is in progress to determine whether insulin accelerates lactate oxidation in frog muscle by stimulating membrane transport or metabolic enzymes. Using <sup>3</sup>H-sorbitol to measure the extracellular water and applying the technique of double labelling, the penetration into the cell water of both D- and L- forms of <sup>14</sup>C-lactate is being investigated by Mrs. T. Ambus and Mrs. E. Dryden. Mrs. J. Still and Mrs. Dryden have altered the extracellular space and Na and K movement into cells by reducing Ca and Mg concentrations and inhibiting the transport enzyme with ouabain. Mr. R. Boegman has achieved a separation and partial purification of two discrete membrane fractions from skeletal muscle. One fraction (believed to be the plasma membrane) is rich in Na-, K-sensitive Mg-ATPase; there is no evidence of this enzyme in the other preparation. In collaboration with Mr. L. Pinteric, membrane fractions have been characterized by



electron microscopy at various stages in the preparative procedure. As part of his investigation of the muscle surface enzymes which convert ATP to IMP, Mr. J. R. Riordan has included a study of the permeability of muscle fibres to nucleotides. Using  $^{45}\text{Ca}$  Dr. J. Forstner has established the basic conditions necessary for the firm binding of Ca by erythrocyte ghosts. The time of incubation, ambient Ca ion concentration, effect of pretreatment with EDTA to remove membrane Ca and the kinetics of Ca removal by washing have been considered.

During the year under review Professor C. S. Hanes, in association with Professor J. T. Wong, has continued studies on enzyme kinetic theory. An experimental study of the kinetic behaviour of liver alcohol dehydrogenase, using enzyme and reactants of improved purity, is nearing completion. Miss P. A. Gurr, a graduate student, has investigated the action of a selection of modifiers on this system.

Professor Hofmann, in collaboration with Dr. Nyburg, Dr. Camerman (Department of Chemistry) and Mrs. L. Rao, has continued the project to determine the structure of pancreatic elastase by x-ray analysis. Excellent diffraction photographs of the native enzyme and of a heavy metal derivative have been obtained. Structural studies of elastase are also being carried out by Miss Wasi. A pH-controlled conformational change has been shown to expose the N-terminal group. Mrs. Rao is studying elastase by chemical modifications. She has obtained an interesting derivative and has been able to measure the apparent ionization constant of the N-terminal amino group. Miss J. Dixon has continued her studies on the conformational state of the N-terminal isoleucine of chymotrypsin and several derivatives of this enzyme. Dr. Dzialoszynski has started a chemical study of bovine prothrombin in order to characterize this molecule. Mr. Sodek is continuing his studies of the chemical nature of the active site of peptidase A from a penicillium mold.

In the laboratory of Dr. E. R. M. Kay, work is in progress on aspects of tumor metabolism. Phase contrast fluorescence microscopy has been used to follow the incorporation of macromolecules into the Ehrlich-Lettré ascites carcinoma cells. Mrs. L. Gibb has studied the incorporation of synthetic polynucleotides and their effect on cell metabolism. Mr. D. Bailey has investigated the biological effects of incorporation of nucleic acids by these cells in relation to possible transformation. Mr. R. Hudgin has explored the biological activity of nuclei isolated from these cells by a variety of methods. Mr. A. Milne has investigated the occurrence of acid soluble components of these cells, and of liver tissue of the tumor-bearing mice. Mr. B. Morrish has used electron microscopy to investigate metabolic significance of lipid containing particles in the ascites cells.

In Dr. Packham's laboratory the mechanisms involved in platelet aggregation induced by adenosine diphosphate (ADP), and the inhibition of this reaction by adenine compounds have been studied by investigating the interconversion of  $^{14}\text{C}$ -labelled ATP, ADP, AMP, and adenosine in platelet rich plasma and in suspensions of washed platelets. Changes in these compounds have been correlated with the course of platelet aggregation and deaggregation.

Mr. L. Pinteric has continued his research programme on the electron microscopy of protein crystals, and has also collaborated with several members of staff in application of electron microscopic methods in their work.

Research in Dr. Scrimgeour's laboratory has been directed to studying the one-electron oxidation and reduction reactions of pteridine cofactors. Mr. M. Archer has been examining the products formed during the oxidation of tetrahydropterins by  $\text{Fe}^{3+}$  compounds (such as ferricyanide). The initial product has been shown by stopped-flow spectrophotometry to be a free radical, which is further oxidized to quinonoid-dihydropterin. Mr. M. Kawai is examining the reduction of both folate and dihydrofolate by such one-electron reductants as viologen radical and  $\text{TiCl}_3$ . It has been recognized for many years that some reducing agents that quickly reduce folate are almost inert with dihydrofolate. Mr. Kawai has shown that each of these reducing agents must act as a one-electron donor; elevated temperature, lowering of pH, and other factors allow the reduction of dihydrofolate by these reagents. Miss



D. Chippel has been determining the chemical requirements for oxidation of both tetra-hydrofolate and dihydrofolate by one electron oxidants. Conditions have been established for isolation of alternate pathways so that characterization of products can be made.

Mr. A. Dennis has recently commenced on a study of the mechanism of reduction of ribonucleotides in mammalian tissues.

Dr. Thompson is continuing his studies on the chemistry and metabolism of phospholipositides in the central nervous system. The positional distribution of saturated and unsaturated fatty acids in the lipid molecule is being determined by selective hydrolysis of the inositides by lipases from venom and pancreas. With Mr. K. Keough, the activity of phosphoinositide phosphodiesterase in developing rat brain and in subcellular fractions has been examined. With Mr. J. Parkes, the metabolism of lipids in outer and inner mitochondrial membranes is being investigated.

In Professor D. O. Tinker's laboratory, studies of the physical properties of complex lipids either isolated from biological sources or synthesised *de novo* are in progress; these include studies of phase relationships in aqueous systems, surface chemistry and ionic properties of lipid phases, and electron microscopy of lipid phases. Mr. Raymond Yuen is engaged in a programme of synthesis of structurally modified analogues of phospholipids for use in these and other studies. Mr. Kenneth Siren is carrying out studies of phase transitions in lipid-water systems using light-scattering as a primary tool, and is also engaged in theoretical calculations designed to elucidate the basis of stability of these phases. Mr. Tai-Wing Wu has succeeded in isolating the enzyme phospholipase A from *Crotalus atrox* venom, and is now engaged in further studies of the structure of this protein, and of chemical and physical aspects of its interaction with phospholipids. Mrs. Barbara Lavers completed this year a programme leading to the M.Sc. degree. Her research, which was jointly supervised by Dr. W. Thompson, involved studies of liver and tumor lipid composition in tumor-bearing mice.

In Professor William's laboratory, Miss Jeanne Orr has been continuing a study of fractionation of mitochondrial membranes in an attempt to bring about a controlled dissection of the oxidative phosphorylation system. In related work, Miss G. Perry has been studying the energy coupling process of beef heart mitochondria in various stages of disruption. Dr. Frances McElroy has continued her investigation of the kinetics of the tricarboxylic acid cycle in rat heart mitochondria using specific activity data in conjunction with model systems in an attempt to identify specific control sites. Using a similar experimental approach, Dr. G. S. Wong has initiated an investigation of the role of anion permeases in the control of mitochondrial metabolism. Mr. Hugh Lawford has been studying the role of adenine nucleotides in macromolecular biosynthesis in *Escherichia coli* by following changes in the pattern of these nucleotides under varying conditions of growth. Miss Kirsten Skov has been employing two widely different experimental approaches in an investigation of the 695 m $\mu$  absorption band of cytochrome C. She has used chemical modification to correlate changes in this band with changes in specific components of the protein and has also been using an extended Heichel molecular orbital programme on the IBM 7094 in an attempt to predict, from energy level calculations, the possible origin of this band.

In Dr. Wong's laboratory a study of the mechanisms underlying the correlation of growth rate and rate of RNA synthesis in bacterial cells continues. Both *in vivo* and *in vitro* assays for amino acid-specific transfer RNA served to establish the variation of transfer RNA with cellular growth rate and suggest a strong regulatory linkage between the different transfer RNA species. An attempt is now being made to define more clearly the possible linkage between transfer RNA and ribosomal RNA. Mr. R. N. Nazar has found a preferential inhibition of RNA synthesis, relative to DNA synthesis, by inhibitors of energy metabolism, and the factors responsible for this difference between RNA and DNA syntheses are being examined. Miss B. G. Stockwell is analysing the biosynthetic relationship between ribosomal proteins and ribosomal RNA.



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## MEDICAL BIOPHYSICS

*Under the direction of Professor H. E. Johns*

The Department of Medical Biophysics will have a large expansion when space becomes available in the new Medical Complex. Dr. Siminovitch has been asked to organize a group to deal with Cell Biology in the Medical Complex. This group will remain as part of the Department of Medical Biophysics. This arrangement will enable Cell Biology to have access to students from Physics and Chemistry backgrounds, who are being attracted in increasing numbers to the Department of Medical Biophysics. Running two divisions as one Department will also have the advantage of enabling the two groups to work on joint projects and save on expensive research equipment.

Professor Aspin is using whole-body scanning and neutron activation to follow the normal and abnormal transportation and metabolism of compounds within the body. Much of this work is carried out in the Hospital for Sick Children.

Professor Bruce with Professor Painter in the Biochemistry Department is studying the hormone erythropoietin and attempting to elucidate its mechanism of action. Professor Bruce is continuing his studies of the action of chemotherapeutic drugs on leukemia in mice; and on mammalian cells in tissue culture.

Professor Cinader is continuing his studies on the regulation of antibody formation. He is also investigating the conformational changes which occur in antigens after combination with antibody.



Professor Cunningham is involved in determining the radiation dose distributions within patients using experimental and computer methods. Working with Professor Bruce, he is developing computer programmes to follow the results of patient treatment over long periods of time.

Professor Gold is studying the replication and modification of nucleic acids and, in particular, the mechanisms of synthesis of nucleic acids, alterations of their specificity, and mechanisms of breakage and reunion of DNA molecules.

Professor Howatson is continuing his studies on the fine structure of cells, viruses and macromolecules. His group is isolating numerous virus mutants with a view to relating function to structure.

Professor Johns and Professor Hunt are continuing to study the effects of radiation damage produced by ultraviolet light and high energy radiation. During the last year, great use has been made of the high energy linac installed in the Physics Department at the University of Toronto. This has made it possible for Dr. Hunt to observe and to study reactive species which live for 0.2  $\mu$ sec after the initial ionizing event.

Professor McCulloch and Professor Till are continuing their studies of growth and differentiation of mammalian cells *in vivo* and *in vitro*. They are attempting to separate cells according to their function and are studying the nature of the substances which promote the growth of blood cells *in vitro*.

Professor Phillips and Professor Miller are examining the cellular basis of the antibody response. They are interested in delineating the various steps involved in the immunological response and in separating the cells responsible for this response.

Professor Sheinin is continuing her biochemical studies on the control of DNA and cell membrane synthesis in normal cells and in those infected with tumour viruses.

Professor Siminovitch and Professor Fuerst are continuing their studies of bacterial viruses. They are interested in the localization and mechanism of action of viral and bacterial genes through studies on defective strains. They have been able to localize many of the genes of the virus lambda and to relate these genes to their particular function.

Professor Stanners is continuing his studies of animal cells at the molecular level. He is concerned with the transcription of genes into ribonucleic acid and the translation of ribonucleic acid into protein.

Professor Taylor is investigating physiological problems related to clinical medicine using biophysical techniques. At the moment, his primary interest is in the Radiology Department of the Toronto General Hospital, where he is involved in setting up sophisticated methods for the use of television in radiology.

Professor Whitmore and Professor Rauth are examining the effects of ionizing radiation, ultraviolet light, and chemotherapeutic agents on mammalian cells with particular reference to their mechanisms of action and the repair of damage produced by these agents.

#### HONOURS

Dr. Bruce was presented with the Medal for Medicine for an essay entitled: "Normal and Malignant Stem Cells and Chemotherapy." He was given the award by Dr. Robert Kerr, retiring president of the Royal College of Physicians and Surgeons of Canada. The award was presented to Dr. Bruce at the Royal College of Physicians and Surgeons in Toronto on January 19, 1968, at the Royal York Hotel.

Professor H. E. Johns was the recipient of a Canadian Centennial Medal (1967).

Professor Louis Siminovitch was the recipient of a Canadian Centennial Medal (1967).

#### SCHOLARLY ADDRESSES

ASPIN, N. *et al.*, "Measurement of Regional Ventilation to Perfusion Ratios with Xenon 135 and a Scintillation Camera," Tripartite Meeting of the American



Physical Society, The Canadian Association of Physicists, and The Mexican Society of Physicists, University of Toronto, Toronto, Ontario, June 1967.

——— "The Measurement of Intestinal Absorption of Copper Using  $^{46}\text{Cu}$ ," Tripartite Meeting of the American Physical Society, The Canadian Association of Physicists, and The Mexican Society of Physicists, University of Toronto, Toronto, Ontario, June, 1967.

——— "The Measurement of Regional Ventilation to Perfusion Ratio in Man Using Xenon 133 and a Scintillation Camera," Canadian Federation of Biological Societies, McGill University, Montreal, P.Q., July, 1967.

ASPIN, N., "The Distribution of Blood Flow in the Human Lung," Canadian Association of Physicists, Calgary, Alberta, June 5-8, 1968.

——— "Measurement of Regional Ventilation and Blood Flow in the Lung Using Xenon 133 and the Scintillation Camera," Society of Nuclear Medicine, St. Louis, Missouri, June 27-30, 1968.

BRUCE, W. R., "Studies of the Action of Chemotherapeutic Agents at the Cellular Level," Department of Radiotherapy and Department of Hematology, Washington University, St. Louis, Mo., November 9, 1967.

——— "Some Relations between Cell Biology and Radiotherapy," Memorial Sloan-Kettering Cancer Center, New York, U.S.A., March 14, 1968.

——— "Studies of the Action of Chemotherapeutic Agents at the Cellular Level," Department of Biochemistry, Dalhousie University, Halifax, Nova Scotia, April 6, 1968.

CINADER, B., "Commitment of Antibody Forming Cells Through Receptor-Site," Institute Pasteur, Paris, France, Colloquium; and an address to the Town Council of Paris (Vice-President) on "The Role of Paris in the Development of Medical Research," July 1967.

——— "Prospects and Perspectives in Immunotherapy," Clinical Cancer Research Conference, Lake Couchiching, Ontario, sponsored by The Ontario Cancer Treatment and Research Foundation, September 1967.

——— "Immunological Consequences of Tolerance - A Complement Defect," University of Wisconsin, Madison, Wisconsin, Immunogenetics, Seminar, Department of Genetics, November 1967.

——— "Antibodies to Enzymes," Department of Physiological Chemistry, University of Wisconsin, Madison, Wisconsin, Seminar, November 1967.

——— "Tolerance as a Regulating Mechanism," University of London, England, St. Mary's Hospital Medical School, March 1968.

——— "Functional and Genetic Analysis of Antibody-Forming Cell Populations," University of Alberta, University Hospital, Edmonton, April 1968.

——— "Tumour Immunology," Medical Students, University of Alberta, April 1968.

——— "Tolerance Regulation," Medical Staff, Paediatric Ward, University of Alberta, University Hospital, April 1968.

CUNNINGHAM, J. R., "Use of the General Electric Time Sharing Computer System at the Ontario Cancer Institute," University of Wisconsin Medical Center, Department of Radiology, April 19, 1968.

——— "Calculation of Dosage in an Irregularly Shaped Beam," Annual Meeting of the Canadian Association of Physicists Division of Medical and Biological Physics, Calgary, Alberta, June 6, 1968.

FUERST, C. R., "Physiological Genetics of a Temperate Phage," Roswell Park Memorial Institute, Buffalo, April 1968.

——— "Additional Defective Mutants of Lambda," Lysogeny Workshop, Sorrento, March 1968.

GOLD, M., "Biochemistry of Lysogeny in *E. coli*," Seventh International Congress of Biochemistry, Tokyo, Japan, August 1967.

——— "Thymineless Death, Colicine and Defective Phage," Division of Biology, Atomic Energy of Canada, Ltd., Chalk River, Ontario, November 1967.



HOWATSON, A. F., "Aberrant Head Forms of  $\lambda$  Bacteriophage," Phage Symposium Workshop, University of California Conference Center, Lake Arrowhead, November 1967.

——— "Rhabdoviruses," Seminar, Department of Biology, McMaster University, Hamilton, Ontario, December 1967.

——— "Structure on Viruses," Department of Biology, York University, Toronto, Ontario, February 1968.

——— "Biophysical and Genetic Studies of Viruses Using Conditionally Lethal Mutants," Roswell Park Memorial Institute, Buffalo, New York, May 1968.

HUNT, J. W., "Pulse Radiolysis in Nanosecond Times," University of Saskatchewan, Department of Chemistry and Physics, October 1967.

——— "Pulse Radiolysis in Nanosecond and Picosecond Times," Atomic Energy of Canada Limited, Whiteshell Nuclear Research Establishment, Pinawa, Manitoba, October 11, 1967.

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——— "Pulse Radiolysis Studies of Reactions of Primary Species in Water with Nucleic Acid Derivatives," International Conference on Radiation Chemistry, Argonne, August 12-15, 1968.

——— "Chemistry at the Speed of Light," Physics Club, McMaster University, Hamilton, Ontario, February 1968.

——— "Nanosecond and Picosecond Detection by Pulse Radiolysis," Department of Chemistry, Ohio State University, Columbus, Ohio, U.S.A., November 15, 1967.

JOHNS, H. E., "Trends in High Voltage Therapy and New Methods of Dose Calculations — Computers in Radiotherapy," Southern California Radiation Therapy Society: Symposium, November 1967.

——— "Biophysics Research at the Ontario Cancer Institute," Veterans Administration Hospital, California, U.S.A., November 1967.

——— "Biophysics Research at the Ontario Cancer Institute," St. Mary's Long Beach Hospital, California, November 1967.

——— "Biophysics," Canadian Undergraduate Physics Conference, McMaster University, Hamilton, Ontario, October 1967.

——— "Intersystem Crossing in Uracil," International Symposium on Basic Mechanisms in Photochemistry and Photobiology, Caracas, Venezuela, December 1967.

——— "U.V. Effects on Nucleic Acids," Roswell Park Memorial Institute, Buffalo, New York, February 1968.

——— "Radiological Physics," and "Research Projects at The Ontario Cancer Institute," Puerto Rico Nuclear Center, Radiotherapy and Cancer Division, San Juan, Puerto Rico, March 1968.

——— "Biophysics," Queen's University, Kingston, Ontario, March 1968.

——— "U.V. Effects on Nuclear Acid Components," The Pennsylvania State University State College, Pennsylvania, U.S.A., May 1968.

MCCULLOCH, E. A., "International Symposium on Hemopoietic Stem Cell Kinetics — Interrelationships between Hemopoietic Precursor Cells," Christie Hospital and Holt Radium Institute, Paterson Laboratories, Manchester, England, October 1967.

——— The Capacity for Differentiation of Hemopoietic Stem Cells. Eidg. Technische Hochschule, Laboratorium für Molekularbiologie chemischer Richtung, Zurich, Switzerland, October 1967.

——— "(1) Virus Induction of Cancer; (2) Heterogeneity in Tumour Cell Populations." Queen's University, Kingston, Ontario, November 1967.

——— "Studies of the Control of Erythropoiesis at the Cellular Level," American Society of Hematology Meeting in Toronto, December 1967.

——— "Differentiation in the Immunological System," Midwinter Conference on Immunologists, Houston, Texas, January 1968.



——— "Stem Cell Assays in Mice and Men," The M. D. Anderson Hospital, Houston, Texas, January 1968.

——— "Hemopoietic Stem Cells in Mice and Men," McGill University, Montreal, March 1968.

——— "Repair of Radiation Injury at the Tissue Level," Symposium on Repair of Radiation Injury at Subcellular, Cellular and Tissue Levels: Mechanisms and Implications, Federation of American Societies for Experimental Biology, Atlantic City, New Jersey, April 1968.

——— "Potential for Differentiation of Hemopoietic Stem Cells and its Relation to Regulation," Rutgers University School of Medicine, New Brunswick, New York, May 1968.

——— "The Significance of Stem Cell Assays in Man and the Mouse," Mount Sinai Hospital, New York, May 1968.

——— "Control of Hemopoiesis at the Cellular Level," New York University, New York, May 1968.

——— "Hematopoietic Precursors," Tissue Culture Association, San Juan, Puerto Rico, June 1968.

MILLER, R. G., "Methods of Cell Separation," McGill University, Montreal, March 1968.

PHILLIPS, R. A., "The Immune Response as a Model System for Studies on Cellular Differentiation," Symposium of the International Society for Cell Biology, Gatlinburg, Tennessee, October 1967.

——— "Properties of Stem Cells," Canadian Society for Immunology, Kingston, Ontario, June 12, 1968.

——— "Differentiation of the Immune System," Department of Molecular Biology, Washington University, St. Louis, Missouri, May 1968.

——— "Priorities and Objectives in Cancer Research," Annual Meeting of the Canadian Cancer Society, Sudbury District, September 1968.

RAUTH, A. M., "The Survival of Mouse L Cells Grown in Different Specific Activities of Tritiated Thymidine," Biophysical Society Meeting, Pittsburgh, Pennsylvania, February 1968.

SHEININ, R., "Membrane Synthesis in Mammalian Cells," Dalhousie University, Halifax, N.S., October 1967.

——— "Studies on the Surface Components of 3T3 Cells," Washington University, St. Louis, Missouri, April 1968.

SIMINOVITCH, L., "Studies on Lambda Bacteriophage Development," St. Thomas Hospital, Mill Hill, London, England, July 1967.

——— "Studies on Lambda Bacteriophage Development," Weizmann Institute, Rehovoth, Israel, July 1967.

——— "Studies on Lambda Bacteriophage Development," Canadian Federation of Biological Societies, Montreal, P.Q., July 1967.

——— "Proliferation and Differentiation of Haemopoietic Stem Cells," Weizmann Institute, Rehovoth, Israel, July 1967.

——— "Nucleoproteins and Heredity," University of Toronto, Toronto, Ontario, August 1967.

STANNERS, C. P., "Cell Structure and Metabolism," The Gordon Conference, New Hampshire, June 1967.

——— "Studies on Translation in Cultured Hamster Cells," Atomic Energy of Canada, Biology Division, Chalk River, Ontario, December 1967.

TAYLOR, K. W., "The Control of Hazards in Hospitals - Inspection, Maintenance and Education," Symposium of the National Research Council of Canada, Ottawa, Ontario, September 1967.

——— "Education and Hospital Maintenance," Workshop on Electrical Hazards in Hospitals, National Academy of Sciences, Washington, April 1968.

——— "Medical Engineering and Biophysics in the Hospital," Ontario Hospitals Association (Hospital Engineers Annual Meeting), April 1968.



——— "Image Isocon Camera Tube in Cineradiology," Symposium of Cineradiology, Rochester, New York, April 25, 1968.

——— "Image Isocon Camera Tube," Association of Radiologists Annual Meeting, Columbus, Ohio, May 11, 1968.

TILL, J. E., "Models of Cellular Differentiation," Department of Statistics, University of California, Berkeley, California, July 1967.

——— "Studies on Hemopoietic Stem Cells," Gordon Cancer Research Conference, New London, New Hampshire, August 1967.

——— "Cytodifferentiation in the Hemopoietic System," American Society of Cell Biology, Denver, Colorado: Department of Radiology and Radiation Biology, Colorado State University, Fort Collins, Colorado, November 1967.

——— "Cellular Differentiation in the Hemopoietic System," Oak Ridge National Laboratory, Biology Division, Oak Ridge, Tennessee, January 1968.

——— "Effects of Radiation on Cellular Proliferation and Differentiation," Monaco, April 1968.

——— "Cellular Differentiation in the Hemopoietic System," the University of Texas, Medical School, Dallas, Texas, May 1968.

WHITMORE, G. F., "Some Radiobiological Studies with Mouse L-Cells," Meeting of Washington Area Radiobiological Association, Washington, D.C., January 1968.

——— "Coding Properties of the Uracil Dimer and Hydrate," Meeting of Biophysics Society, Pittsburgh, Pennsylvania, February 1968.

——— "Repair of Radiation Damage in Mammalian Cells," Rochester, New York, February 1968.

——— "Studies on the Response of Mammalian Cells to Radiation and Various Chemotherapeutic Agents," Sloan-Kettering Institute, New York, March 1968.

——— "Repair at the Level of the Mammalian Cells," Atlantic City, Annual Meeting of Federation of Experimental Biology, April 1968.

——— "Mammalian Cell Killing by Inhibitors of DNA Synthesis," Meeting on Cell Kinetics, Chicago, February 1968.

——— "Recovery from Radiation Damage in Mouse L-Cells," Roswell Park Memorial Institute, Buffalo, New York, March 1968.

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## INSTITUTE OF BIO-MEDICAL ELECTRONICS

*Under the direction of Professor N. F. Moody*

This year has seen the Institute of Bio-Medical Electronics return from temporary exile in the Sandford Fleming Building to its original quarters in the Electrical Building — with the difference, however, that the facilities have in the meantime been improved to include modern physiological, biochemical, and engineering laboratories and classrooms. Research is carried out here by ten Ph.D., eleven M.A.Sc., and three M.Eng. candidates.

The students are supervised in their researches by six scientists, five of whom hold academic appointments, and whose combined skills cover the areas of Engineering, Physics, Mathematics, Medicine, Neurosurgery, Physiology, etc. Next year an organic chemist will join our staff and thus increase our strength in that area. Supervision is also given by some 14 Members of the Institute who hold appointments in many of the life science and engineering departments. There is a supporting engineering and technical staff of 9, and interestingly enough, one of these is an M.D. who has accepted a technical position in order to gain engineering experience.

We are continuing with five graduate courses designed especially for our students and have added one seminar course for medical students. A major step has been made by offering a half-course option in Bio-Medical Engineering to students in their fourth year of Electrical Engineering. It is hoped that in future years this can be made available to all Engineering students, thus enabling them to "sample" Bio-Medical Engineering, and also providing a broader framework of reference for those who elect to continue in the field.

Highlights of the year's researches include the development of a neural impe-



dance probe which is now in clinical use, a new gamma ray camera for cancer diagnosis and other radioactive tracer applications, and an "Artificial Pancreas" which, though still in an early stage, shows great promise.

In order to promote better exchange of scientific information between widely separated research centres, the Institute hosted visits by scientists from a variety of countries such as Japan, France, and the U.S.S.R. In addition, interested people closer to home were able to visit when the Institute held its Open House in November. Time has also been devoted throughout the year to the vast preparations for the Second Canadian Medical and Biological Engineering Conference that the Institute is organizing for September 1968.

## MEDICINE

*Under the direction of Professor K. J. R. Wightman*

This year will undoubtedly be remembered as "The Year of the Committee." Intensive and broadly based planning has been under way with regard to the curriculum, the organization of the Faculty, and each of the teaching hospitals. The process has been time-consuming, fatiguing and instructive. So far, not many final decisions have been made, and there are those who begin to be weary of the democratic process and are calling for more "leadership." Morale has been weakened by hints of delay and curtailment. Repeated surveys of our needs have been carried out by different groups, from differing points of view, arriving at different conclusions. They all appear to indicate, however, that our needs are incredibly great in terms of space, facilities, personnel and support for research. It has to be remembered that we are looking not only at the requirements of the moment and the future, but also at an accumulated deficit of many years' standing. Our Department of Medicine and our teaching hospitals have not advanced as they should have done since the war. The added support for growth in the past two or three years has been most gratifying, but much more needs to be done.

In the meantime, the effort which has been put forth by so many people has had many beneficial side-effects. Those who have taken part are achieving a much better understanding of our School, and a greater degree of involvement. With a little more time we will pull out of the morass into a period in which things begin to fall into place and well-informed decisions can be made. The time we have spent in committees has not been wasted, but there is no doubt that ways might have been found to make them more effective. We are all indebted to those who have taken part in this work.

One accomplishment which affects all departments, but is of particular interest to the Department of Medicine, is the establishment of the Division of Clinical Science in the School of Graduate Studies, under the able leadership of Dr. J. C. Laidlaw. We are all looking forward to the day when the research laboratories on the campus and in the various teaching hospitals will be available to the scientists in our departments and to those we hope to recruit. At the same time we devoutly hope that the problem of providing for major equipment to furnish these laboratories will be solved. One of the major frustrations of the past year has been the impasse which has existed *vis à vis* the Medical Research Council, the Health Resources Fund and other agencies charged with the provision of capital funds for research. In some hospitals the staff association fund has been able to act as a stop-gap. Many members of our staff took part in studies of the research situation across the country on behalf of the Medical Research Council, very often to the detriment of the research they were carrying on at home. It is to be hoped that their findings can be translated into some sort of action which will reinforce that of other studies which had been carried out previously.

With the advent of a new Professor of Psychiatry, a valued limb of the Department of Medicine in the teaching hospitals has been amputated and autonomous Departments of Psychiatry are being set up in the hospitals. While this is consonant



with the modern trend towards specialization, one regrets the loss of integration which it entails. The same forces are acting to produce a separation of Neurology, Cardiology, and all the rest. These are being resisted on the basis that it is the duty of the Department of Medicine to provide an element of cohesion and synthesis, and the responsibility of each of its members to maintain an interest in the progress which is being made in other fields, and indeed in the world we live in.

One counter to the trend towards specialization has been the development of general practice units of various sorts in the teaching hospitals. So far, these exist under the aegis of the Department of Medicine, which has accepted the idea that in Canada at least an effort should be made to define the function of the general practitioner, to train men to undertake this work and to help them fashion a mode of life which is not only tolerable but enjoyable and rewarding. This effort is already well under way, and will undoubtedly merge with a study of the problem of community medicine in general which will affect many other faculties in the University.

We were all saddened at the death of Hagar Hethrington, who had served the Department long and faithfully at St. Michael's Hospital and at Sunnybrook Hospital. We are also sorry to report the resignation of Dr. E. R. Yendt, who will be Professor of Medicine at Queen's University and Dr. M. Cohanin who will accompany him to that School. Dr. J. K. Davidson is leaving to take up a post at Emory University and Dr. G. W. Stock is going to the North York General Hospital to be Physician-in-Chief. Dr. Norman Wrong, whose retirement we have celebrated once, but who achieved a new lease on life at Sunnybrook Hospital, is retiring again, positively for the last time.

We are tremendously grateful to these people for what they have done, and we wish them well in their new endeavours. These losses have been to some extent balanced by acquisitions in staff. One might mention Dr. Brian Webster, Dr. K. N. Jeejeebhoy, Dr. Helen Farquharson, Dr. A. G. Becker, Dr. Douglas Wilson, Dr. Guy Emery and Dr. D. Osoba.

Our Department is growing very rapidly. The complexity of the operation has increased to an extent which has led to a decision to appoint a Director of the Department of Medicine at the Toronto General Hospital who will in effect carry out the functions of the Physician-in-Chief there, so that the Departmental Chairman will be relieved of these responsibilities.

We seem to be standing on the verge of a new era. We are all waiting to see how it will be defined. It is evident that we are being offered support from government which may entail some loss of freedom. On the other hand we may find that an opportunity is being offered to us which we have never had before. We must obviously balance practical considerations with those which are more idealistic. The function of boards of trustees and governors has changed radically in the past few years. This change has not yet resulted in a perfect decision-making process. While the students have drawn attention to this vociferously, the implications are much wider, and this is a problem which affects the Medical School more acutely than any other faculty in the University. It is to be hoped that a solution can be found before we are all suffocated by the output of these xerox machines on campus.

During the past academic year, the Department of Medicine devoted four of the regular bi-monthly staff meetings of the Toronto General Hospital to an appraisal of education of medical students. Many new members of the Department who are responsible for teaching had the opportunity to consider the principles and methods involved and to seek the opinions of experienced colleagues. The establishment of a new curriculum indicated that the time was right for discussion of teaching methods and examination procedures. Evolving attitudes and values of modern undergraduates required that modification in methods of teaching and proffered incentives be achieved to sustain a necessary level of motivation.

At the initial meeting, most attending agreed that teaching and learning was a give-and-take affair, that neither teacher nor student should be dogmatic, that teachers teach and learners learn in ways characteristic of the individual and that some attempt to match similar types of personality would yield beneficial results.



Teachers in the Medical School would do well to arrange more seminars on education where they could exchange ideas, question invited educators from other disciplines and keep themselves up-to-date on the activities of our entire school system. A bibliography was distributed in the hope that a new segment of literature will become apparent to those interested in teaching.

The principles and methods of teaching case work-ups was the theme for the second meeting. The medical student at this stage of his training seems able to master all the necessary skills. He should have the opportunity to do so in a relatively few weeks at the start of the semester and receive close supervision. The new audiovisual aids were seen as tools to motivate students rather than to disseminate facts to them.

The third evening reviewed the existing programme for the third medical year and included a discussion of the examinations for that year. The highlight of the meeting was the forum discussion in which some of the students expressed their ideas in a sincere and constructive manner. The students want progressively more flexibility in curricula but not necessarily free time to do with what they please. Their chief request was more interaction with staff.

At the final meeting, the principles of evaluation and those methods in vogue at this Medical School were debated. Dr. Bryan Hudson, Chairman, Department of Medicine of the Medical School at Monash, Australia, reviewed the taxonomy of cognitive function and indicated some of the difficulties in developing valid ways to assess ability in each of these categories. Reference was made to the National Board Examinations in the U.S.A. wherein, via audiovisual technology, students were given identical situations which allow more valid comparisons of performance. The question of retaining absolute standards or relative ones was discussed, but no conclusion was reached.

In the next year, it is hoped that a series of seminars can be staged to allow teachers to develop, assess and evaluate programmes applicable to their own spheres of teaching. The enthusiasm shown by Departmental members from all the University hospitals suggests that such a programme will be productive.

## RESEARCH

### *Allergy-Immunology*

Dr. I. Broder (TWH) has been studying the mechanism of immunological histamine release in the guinea pig lung. The role of soluble antigen-antibody complexes in human and animal disease is being assessed in collaboration with Dr. J. Reynolds and Dr. D. Gordon of Toronto and Dr. L. Karstad and Dr. I. C. Pan of Guelph. Dr. Broder is also, with Dr. D. R. McCourtie, correlating the clinical and immunological parameters of persons with atopic respiratory disease. Dr. S. Dubiski (TWH) has been conducting research into the problems related to antibody synthesis. Genetic factors that regulate antibody synthesis, and methods by which this control can be overruled, were studied.

### *Cardiovascular*

Dr. H. E. Aldridge (TGH) has continued hemodynamic studies of postmyocardial infarction aneurysms. Left ventricular functions and its relationship to revascularization operations are being studied. A follow-up study of hemodynamic changes after replacement of the aortic valve by homografts has also been carried out. Dr. D. S. Beanlands (TWH) with Dr. Williams has reviewed the results of implanting pacemakers in patients with heart block. With Dr. Varma, a review has been carried out on the complications occurring in patients with myocardial infarction admitted to the Coronary Unit. A double-blind control study of propranolol is being carried out with Dr. T. T. Zsoter and a study of liver function in congestive heart failure with Dr. G. Forstner. Dr. K. W. G. Brown (TGH) has been particularly interested in the use of Digitalis in acute myocardial infarction. In addition he has been studying patients with syncope and transient cardiac arrhythmias by the use of 10-hour ECG recordings. Dr. L. Casella (SMH) has completed a one-year study of Digitalis-induced



arrhythmias. Dr. P. G. Forbath (SMH) has designed a flow model to imitate conditions described for the "Carotid Circulation Dye Test" and is conducting flow studies. Dr. R. L. MacMillan (TGH) in conjunction with Mr. Campbell Cowan of the Best Institute has been studying the stickiness of red blood cells in moving blood in patients with acute myocardial infarction. Parallel studies are in progress using an *in vitro* system to study red cell surface activity that is related to clotting of fibrinogen. Dr. E. D. Wigle (TGH) has continued to investigate various aspects of muscular subaortic stenosis. More recently, his attention has been directed toward a better understanding of the mitral insufficiency that invariably accompanies this condition.

#### *Dermatology*

Dr. H. J. Donsky (TGH) has been carrying out three clinical trials – high strength fluocinotone acetonide in various recalcitrant skin disorders, Griseofulvin in Psoriasis and Complamin in Vitiligo. In addition, various skin disorders are being studied by means of electron microscopy. Dr. M. Eagleson (TWH) has been assessing the effect of a low tryptophan diet in psoriasis, and with Dr. H. Haberman has been conducting a clinical trial of topical antimetabolites in the treatment of psoriasis. Dr. H. Haberman (TWH) in collaboration with Dr. I. A. Menon has been working on two projects – control mechanism involved in pigmentation and serum tyrosinase levels in melanoma. Dr. D. P. Varadi (WH) has started work on the nature of connective tissue changes in the skin with age. Dr. M. G. Williams (WH) continues his studies on the *in vitro* cultivation of the human wart virus and with Dr. B. Krafchik is studying the electron microscopic appearances of wart tissue grown *in vitro*.

#### *Endocrinology*

Dr. B. Berris (NMSH) with Dr. D. Davidson and Dr. B. S. Leibel has completed a study of sixteen patients with enlarged parotid glands. This manifestation was felt to be a clinical sign in diabetes that is often overlooked. Dr. N. Forbath (TGH) has been working with an insulin immunoassay and in addition has been studying the activity of the Coricycle in the normal and diabetic dog. Dr. H. P. Higgins (SMH) in collaboration with Dr. A. Katz has been continuing his research in "subacute thyroiditis." Attempts are being made to implicate a virus agent for this disease. In collaboration with Dr. R. Volpe and Mr. V. Row (WH), studies are being carried out on the metabolic effects of thyroxine and triiodothyronine in relation to thyroxine binding protein levels in the blood of myxedematous patients. Dr. D. W. Killinger (WH) has been carrying out research in the area of biosynthesis and metabolism of adrenal steroids with special interest in sulfate conjugates. Methods for the determination of urinary testosterone and plasma dehydroisoandrosterone sulfate have been set up and are being applied to clinical studies of gonadal disorders. Drs. I. Salti, J. L. Ruse and J. C. Laidlaw and Miss M. Stiefel have continued their studies on patients with hypertension and increased aldosterone secretion. Dr. D. L. Schatz (TWH) has been studying the effects of Heparin on thyroxine binding; the effect of hemodialysis on thyroid function and the peripheral regulation of thyroxine metabolism. Dr. R. H. Sheppard (TWH) with Drs. Chaitanya, Zsoter and Schatz has been assessing the effects of Propranolol upon the thyrotoxic patient. With Drs. Schatz, Chaitanya and Steiner a study of the effects of Heparin on thyroid function and thyroid hormone binding has been carried out. The correlation of serum growth hormone levels with radiologic skin thickness measurements in acromegaly has been conducted with Drs. Meema, Chaitanya and J. Martin. Dr. R. Volpe (WH) completed a study of radioablation of the thyroid gland in Graves' disease, and the effect of this procedure on LATS levels, thyroid antibodies, exophthalmos and pretibial myxoedema. Studies were also carried out of plasma triiodothyronine concentrations under various circumstances. In addition, a study of patients with testicular feminization was completed.

#### *Gastroenterology*

Dr. J. R. Bingham (TWH) with Dr. V. Aynacyan completed a pH study of the upper gastrointestinal tract using a radio telemetering capsule. Dr. S. V. Feinman



(NMSH) has been assessing LDH-Isoenzymes in patients with various conditions. A study of bile salts, amino acids and proteins in experimentally produced gall stones and cholangitis in rabbits is being pursued. Dr. G. G. Forstner (TWH) has been investigating glycolipids and biosynthesis of glycoproteins in the small intestinal surface membrane. The cause and nature of renal changes associated with severe hepatic disease is also being investigated. Dr. J. Hogarth (TWH) has been working on the transplantation of livers in dogs. Dr. K. N. Jeejeebhoy, since taking up his new post, has been setting up laboratory facilities to study megaloblastic anemias (in collaboration with Dr. J. Crookston), and the metabolism of proteins and bile acids.

### *Haematology*

Dr. J. A. Blakely (SBH) continues his studies of the effect of anturan on platelets. Dr. K. R. Butler (SMH) reports that an immuno electrophoresis lab and coagulation lab have been set up at St. Michael's Hospital. A number of unusual proteins have been discovered and are being studied further. Dr. J. H. Crookston (TGH) has continued studies of the antigens and antibodies of the Ii blood group system. With Dr. W. Francombe, an investigation of a "new" kind of congenital dyserythropoietic anemia. With Dr. Jeejeebhoy and Dr. Growe, laboratory facilities have been set up to do microbiological assay on folic acid and vitamin B<sub>12</sub> and tests for anti-Intrinsic Factor antibodies. With Dr. McLeish, 28 cases of sideroblastic anemia have been reviewed. Dr. R. Herst (TGH) has evaluated a preparation of factor IX concentrate. In addition, effects of protamine sulphate excess on coagulation tests in dogs has been assessed. Dr. M. A. Hooey (WH) is also assessing the effect of anturan on the survival and adhesiveness of platelets and the control of recurrent thrombophlebitis. Dr. E. A. McCulloch (PMH) in collaboration with Dr. J. E. Till and Dr. L. Siminovitch has continued studies of hemopoietic stem cell growth and differentiation. Progress has been made in the study of hemopoiesis in cell culture. In collaboration with Dr. J. S. Senn, the culture technique has been applied to cells from human bone marrow. Dr. H. Meindok (TWH) is continuing his studies of serum proteins in the elderly and chemotherapy of disseminated bronchial carcinoma. Dr. J. G. Watt (TWH) continues his investigation of platelet survival in patients with extensive psoriasis and in patients with thrombocytopenia.

### *Metabolism and Diabetes*

Dr. C. K. Gorman (TGH) is setting up a radio-immuno-assay for glucagon. He is also investigating the inhibitory effects of insulin on the uptake of free fatty acids by liver slices *in vitro*. Dr. G. Steiner's work has been primarily concerned with two areas. The studies of lipoprotein metabolism were concerned with characterization of lipoprotein lipase activity in various lipemic disorders; the nature and development of hyperlipemia in diabetes and the role of insulin in influencing adipose tissue uptake of lipoproteins. The studies on brown adipose tissue have concerned themselves with the role of the nervous system in controlling the metabolism of brown adipose tissue and with the factors which limit the rate of fatty acid production in brown adipose tissue homogenates. Dr. P. G. Walfish (NMSH) has been performing carbohydrate and lipid metabolic studies of the mechanism of action of diazoxide – a potent diabetogenic agent of therapeutic value in the management of hypoglycemia. Clinical studies of lipid and carbohydrate interactions in response to diet and drugs are continuing on patients with plasma hyperlipoproteinemic disorders. An insulin immunoassay using dextran coated charcoal has been developed and is being used for animal and human studies. Dr. E. R. Yendt (TGH) with Dr. G. Guay and Dr. D. A. Garcia has been working on a number of research projects – prevention of renal calculi with thiazides; effects of thiazides on calcium and urinary hydroxyproline excretion in metabolic bone disease; effects of chronic acidosis on morphology and mineral content of the rat skeleton; effects of age, sex and certain hormones on serum calcium levels and effects of Probenecid and thiazides given singly and in combination on the urinary excretion of electrolytes and on acid-base equilibrium.



*Neurology*

Dr. J. G. Humphrey (ТГН) is continuing his investigation of patients with neuromuscular disorders by means of clinical, physiological, histological and cyto-chemical methods. Other studies have included an assessment of the value of thiazides and acetazolamide in the treatment of hyperkalemic and hypokalemic periodic paralysis. Special studies of peripheral biopsies have been initiated using cryostat sectioned nerve, histochemical stain reactions and teased single nerve fibre preparations. The effectiveness of ACTH in the treatment of acute idiopathic (Bell's) palsy is being assessed in a controlled trial. Dr. J. T. Marotta (СМН) is continuing a study of the use of tegretol in tic douloureux. Dr. A. M. Park (ТВН) with Dr. L. Solursh has been studying patients who have taken L.S.D. and other drugs from the standpoint of possible E.E.G. changes. Dr. J. C. Richardson (ТГН) has carried out clinical studies on vertigo with Dr. W. Brown and has been studying further cases of progressive supranuclear palsy. Dr. J. R. Wherrett (ТГН) has continued work on his major project "Analysis of Glycolipids". A detailed analysis of the glycolipids in post-mortem tissues from a case of Fabry's disease has been completed. In collaboration with Mr. Grodzinski studies have continued of glycolipids in the retina. Dr. V. H. MacMillan, working with Dr. Wherrett, has firmly established the existence of gangliosides in peripheral nerve. A study of erythrocyte glycolipids in Huntington's chorea was completed. The presence of gangliosides in erythrocytes was established and they were partially characterized.

*Pharmacology (Clinical)*

Dr. W. A. Mahon (ТГН) in association with Dr. S. W. Klein and Dr. J. E. Morch has made a study of the cardiovascular effects of glucagon in man. He has also completed a study of the distribution of Doxycycline in man. In addition, studies on the effects of cardiovascularly active agents on distribution of blood flow in dogs and the effect of labour in patients on cardiac output are continuing. Dr. T. T. Zsoter (ТВН) in collaboration with Dr. Nadasdi has been investigating the effect of morphine and meperidine on the peripheral circulation, particularly on the venous system. In collaboration with Dr. Beanlands, studies are continuing of the effect of propranolol in patients with angina pectoris. The results are being compared with coronary angiography. Recently an assessment of a new hypotensive drug, catapres, was started. In conjunction with the Department of Pharmacology, studies are underway on the effect of thiazide and related diuretics on the veins and the effect of hypoxia on the response to various vasoactive drugs.

*Rehabilitation and Geriatrics*

Dr. W. M. Franks (ТВН) has been assessing oral zinc medication for geriatric patients with pressure sores. A retrospective study of the incidence of urinary tract infections in the geriatric age group was also carried out. In collaboration with Dr. Reynolds and Dr. Wiley, a study is being carried out on the rheumatoid arthritic hand. Dr. R. E. Renaud (ТВН) has continued his research into the question of post-prostatectomy urinary incontinence. The effects of treatment are being monitored by a specially constructed transducer which was constructed by Mr. deKat of the Department of Bio-Medical Electronics.

*Renal Disease*

Dr. G. A. de Veber (ТВН) in collaboration with Dr. Sekiguchi has set up a method of tissue matching by the use of leucocyte typing. In collaboration with Dr. A. Rapoport, a study is continuing of immunosuppressive therapy in various forms of glomerulonephritis. Dr. A. Rapoport (ТВН) with Dr. H. Husdan has completed a comparison study of creatinine and inulin clearances measured in the same subjects. A study of renal concentrating capacity was carried out by comparing serum and urine osmolalities in normal subjects and patients with renal disease during progressive dehydration. Urinary hydroxyproline is being studied in relationship to



bone disease. In collaboration with Dr. G. de Veber studies are continuing on the effects of immunosuppressive drugs on various forms of kidney disease. With Dr. C. McLean and Dr. G. de Veber focal and proliferative glomerulonephritis are being studied by means of renal biopsies, renal function tests and immunological data.

#### *Respiratory Disease*

Dr. C. R. Woolf (TGH) is studying a variety of problems in the cardiorespiratory laboratory. Work continues on two major projects—the respiratory effects of regular cigarette smoking in women and methods of selection of emphysema patients for surgery, and an evaluation of the results. Short term projects include a study of the regulation of respiration by oxygen tension oscillations in arterial blood; differentiation between small and large airway obstruction using the body plethysmograph; computer programming in a Respiratory Function Laboratory; the concept that gas distribution in the lung is related to instantaneous rate of change of intrapleural pressure; and, on-line interpretation of acid-base data. In collaboration with Dr. H. B. Fairley a comparison is being made of intermittent positive pressure breathing and intermittent nikethamide drips in acute respiratory failure. In collaboration with Dr. D. Wood and Dr. R. Haddon, an assessment is being made of the use of combined xenon inhalation scans and radioactive albumin intravenous scans in the measurement of ventilation-perfusion relationships in the lung.

#### *Rheumatology*

Dr. D. A. Gordon (WH) has been characterizing and quantitating the immunoglobulins in rheumatic disease. In addition, tissue culture studies are being conducted of connective tissues in patients with rheumatoid arthritis and other rheumatic diseases. Dr. J. B. Houpt (NMSH) is continuing his research into abnormalities of tryptophan metabolism in collagen disease; the effects (in patients with cystinuria) of penicillamine on cystine and tryptophan metabolism; the effects in patients with carcinoid syndrome of enzymatic block of serotonin metabolism on tryptophan metabolism, and evaluation of plasma and urine oxypurine in uric acid metabolism. Dr. M. A. Ogryzlo (WH) in collaboration with Dr. Houpt has been evaluating the use of allopurinol in gout and disorders of uric acid metabolism. In collaboration with Dr. Gordon and Dr. Pruzanski, immunoglobulins are being studied in rheumatic diseases. The correlation of immunoglobulins with the course of myeloma is being studied with Dr. Pruzanski and Dr. D. E. Bergsagel. Tryptophan metabolism in rheumatic diseases is being investigated with Dr. Houpt. Dr. W. J. Reynolds (TWH) is carrying out a prospective study of hand deformities in rheumatoid arthritis. In addition, turnover studies of rheumatoid factor are also being carried out. Dr. H. A. Smythe (WH) has developed a method to assay xanthine oxidase using radioactive xanthine. As well, studies of the effects of pyrazone compounds on platelet function is continuing with Dr. J. Blakely.

#### *General Practice Units*

The General Practice Unit at the Toronto Western Hospital is continuing a research project endeavouring to determine if it is possible to differentiate clinically between viral and bacterial upper respiratory infections.

#### VISITORS

Visitors included Professor Jan Brod, Praha, Czechoslovakia; Professor Lucien Brumpt, Paris, France; Dr. B. Clarkson, New York, N.Y.; Dr. J. V. Dacie, London, England; Dr. Z. Dubinski, London, England; Dr. W. K. Engel, Bethesda, Maryland; Dr. C. E. Ford, Berkshire, England; Dr. J. Goodwin, London, England; Dr. D. Hamer, London, England; Dr. G. Hawton, Manchester, England; Dr. Harley, Halton; Dr. J. Hay, Montreal, P.Q.; Dr. G. Howitt, Manchester, England; Pro-



fessor D. Hioco, Paris, France; Dr. J. E. Howard, Baltimore, Maryland; Dr. M. Kuxerz, Praha, Czechoslovakia; Dr. S. Lee, Edmonton, Alberta; Dr. G. Loewi, Taplow, England; Dr. N. Matthews, Edinburgh, U.K.; Dr. G. Miller, Madison, Wisconsin; Dr. G. A. H. Miller, London, England; Professor Henry Miller, Newcastle, England; Dr. R. Rohmer, Sweden; Dr. Slade, British Columbia; Dr. G. Sloman, Melbourne, Australia; Dr. P. K. Thomas, London, England; Dr. J. Vaughan, Rochester, N.Y.; Dr. O. Wrong, London, England; Dr. R. Young, St. John's, Newfoundland.

#### HONOURS

DR. H. J. M. BARNETT, Centennial Visiting Professor, Montreal Neurological Institute and McGill University; Honorary Member, Academy of Neurology, Puerto Rico. DR. D. S. BEANLANDS, Chairman, Section on Cardiology, Ontario Medical Association; Fellow, Council on Clinical Cardiology, American Heart Association. DR. J. S. CRAWFORD, Chairman, Committee on Credentials and Examinations, Canadian Board of Prosthetists and Orthotists; Member, Task Force Committee, Province of Ontario. DR. W. T. W. CLARKE, Member, Executive Council, Canadian Diabetic Association; Chairman, National Diet Counselling Service Committee, Canadian Diabetic Association; Chairman, Drug Quality and Therapeutic Committee, Province of Ontario; Chairman, Special Drugs and Pharmacy Committee, Toronto General Hospital. DR. G. A. de VEBER, Member, The Canadian Nephrological Society; Member, American Nephrological Society; Member, The European Transplantation and Dialysis Society; Member, The Canadian Society for Immunology; Secretary, Period II Curriculum Committee, Genito-Urinary Disease. DR. J. W. DIGBY, Editor, *Modern Medicine of Canada*; Director of Professional Education, Canadian Arthritis and Rheumatism Society; Chairman, Library Committee, Academy of Medicine. DR. H. J. DONSKY, Secretary, Academy of Medicine, Section of Dermatology. DR. S. DUBINSKI, Secretary, Canadian Society for Immunology; Member, Council of the Ontario Antibody Club. DR. W. M. EAGLESON, Secretary, Academy of Medicine, Section of Dermatology. DR. P. G. FORBATH, Member, Canadian Pediatric Society. DR. W. FRANKS, Chairman, Physical Medicine Section, Ontario Medical Association. DR. J. HOGARTH, President, Federation of Medical Women of Canada. DR. M. A. HOOEY, Honorary President, Medical Women's Undergraduate Association, University of Toronto. DR. J. B. HOUP, Member, Medical Advisory Committee, Canadian Arthritis and Rheumatism Society, Ontario Division. DR. J. G. HUMPHREY, Visiting Lecturer, Neuromuscular Division, Section of Neurology, Mayo Clinic, Rochester, Minnesota. DR. J. C. LAIDLAW, Visiting Professor, Royal Victoria Hospital, Montreal; Visiting Professor, Department of Biochemistry and Medicine, University of Western Ontario, London; Director, Institute of Medical Science, School of Graduate Studies, University of Toronto; Associate Editor, Medcom (Medical Communications). DR. D. H. LEY, Visiting Haematologist, Sweden. DR. D. R. MCCOURTIE, Member, Canadian Society for Immunology; Member, American Academy of Allergy. DR. E. A. McCULLOCH, Graduate Secretary, Institute of Medical Science, University of Toronto. DR. W. J. McILROY, Member, Medical Advisory Board, International Multiple Sclerosis Society. DR. J. E. MORCH, Co-ordinator of Electives, Faculty of Medicine. DR. M. A. OGRYZLO, Chairman, Review Panel, The Gairdner Foundation; Member, Board of Directors, Canadian Arthritis and Rheumatism Society; Member, Medical Advisory Board, Canadian Hemophilia Society. DR. A. M. PARK, Member, Board of Directors, Multiple Sclerosis Society of Canada (Ontario Division); Member, Board of Directors, Epilepsy Information Centre of Metropolitan Toronto; Member, Board of the Canadian Medic-Alert Foundation; Certificate of Merit, Multiple Sclerosis Society of Canada. DR. R. L. PERKIN, Chairman, National Committee on Undergraduate Education, College of Family Physicians of Canada.



DR. J. C. RICHARDSON, Visiting Professor, Montreal Neurological Institute. DR. J. S. SENN, Elected, Secretary of Medical Staff, Sunnybrook Hospital Medical-Dental Staff. DR. G. STEINER, Elected, Councillor, American Federation for Clinical Research (Eastern Section). DR. D. A. STINSON, Member, American Council on Medical Television; Member, National Scientific Planning Council of the Canadian Mental Health Association; Member, Executive of the University of Toronto Medical Alumni Association; Member, Medical Legal Society, Toronto; Member, Medical Advisory Board to the Medical Post. DR. R. VOLPE, Member, Program Committee, American Thyroid Association; Member, Programme Committee of the Canadian Society of Clinical Investigation; Chairman, Endocrine Committee, Period II, New Curriculum; Secretary, Period II Chairmen's Curriculum Committee. DR. P. G. WALFISH, President, The Clinical Research Society of Toronto. DR. J. G. WATT, Chairman, Medical Associate, Toronto Western Hospital. DR. J. R. WHERRETT, Medical Research Council Grant Committee for Neurological Sciences; Member, Canadian Biochemical Society. DR. K. J. R. WIGHTMAN, appointed to Medical Advisory Committee, National Sanitarium Association. DR. E. D. WIGLE, elected University of Toronto Councillor, Canadian Society for Clinical Investigation; Chairman, Period II Cardiovascular Curriculum Committee. DR. D. R. WILSON, elected to Canadian Society for Clinical Investigation. DR. C. R. WOOLF, Member, Committee of Inhalation Therapy, American College of Chest Physicians; Member, International Committee on Medical Bio-electronics, American College of Chest Physicians; Chairman, Joint Committee of Ontario Thoracic Society and Ontario Tuberculosis Association. DR. N. WRONG, Vice-president, American Dermatologic Association. DR. C. W. WYSE, Secretary, Dermatology Division, Ontario Medical Association; Member, Toronto Dermatologic Society; Member, Canadian Dermatology Society. DR. E. R. YENDT, President-elect, Canadian Society of Nephrology.

#### SCHOLARLY ADDRESSES

DR. H. J. M. BARNETT, "Post-Traumatic Syringomyelia," National Hospital, Queen Square, London, England; "Progressive Cystic Myelopathy Following Paraplegia and Brachial Neuropathies Mistaken for Cervical Spondylosis," Western Federation of Neurological Science Societies, San Diego, California; "The Pathogenesis of Post-Traumatic Spinal Cord Cysts," University of Southern California.

DR. R. BAUMAL, "Characteristics of the Rheumatoid Biologically Active Factor," Toronto Society for Clinical Research; "Forssman Antibody as an Inhibitor of Anaphylactic Histamine," International Congress of Allergology, Montreal; "Mechanism of Histamine Release from Guinea Pig Lung by Antibody to  $\gamma$ -globulin," Canadian Society for Clinical Investigation.

DR. D. S. BEANLANDS, "Complications of Myocardial Infarction," County Medical Society, Peterborough; "Complications of Acute Myocardial Infarction," Medical Alumni Association, University of Toronto; "Demand Pacemakers," Section on Cardiology, Academy of Medicine.

DR. I. BRODER, "Anaphylactic Histamine Release: Same or Different Receptors for Homologous and Heterologous Antibody," Canadian Society for Immunology.

DR. K. W. G. BROWN, "Changing Role of Nurses in Coronary Care Units," American Heart Association, Washington, D.C.; "Heart Failure in Acute Myocardial Infarction"; "Heart Failure and Pulmonary Oedema in Acute Myocardial Infarction"; "Shock in Acute Myocardial Infarction," American College of Cardiologists; "Acute Myocardial Infarction," Saskatoon Division, CBA, Saskatoon; "Treatment of Acute Myocardial Infarction," Porcupine Medical Society, Timmins, Ontario; "Nurses' Role in Coronary Unit," Canadian Cardiovascular Society; "Organization of Coronary Unit," Moncton Medical Society, Moncton, N.B.;



"Changing Mortality in Acute Myocardial Infarction in Coronary Unit," Maritimes Cardiovascular Society, Amherst, N.S.; "Power Failure in Acute Myocardial Infarction," New York State Heart Assembly Conference on Coronary Care Units, Rochester, N.Y.

DR. J. S. CRAWFORD, "A Practical Approach to the Treatment of the Arthritic Patient," Stratford General Hospital medical staff; "Treatment of the Arthritic Patient," St. Joseph's Hospital Annual Clinical Day.

DR. J. H. CROOKSTON, "History of Blood Transfusion; the Laboratory Investigation of Transfusion Reactions," University of Washington, Seattle; "Adverse Reactions to Blood Transfusion," British Columbia Antibody Club, Vancouver; "Drug-induced Blood Dyscrasias," "Hemoglobinopathies," "Myeloproliferative Syndromes," Faculty of Medicine, Dalhousie University, Halifax.

DR. W. T. W. CLARKE, "The Kidneys in Relation to Diabetes," The Toronto District Branch of the Canadian Diabetic Association; "Serum Enzymes in Diagnosis," The Albany Medical College; "Coping with the Drug Deluge," 12th Annual Scientific Assembly, College of General Practice of Canada, Mexico City; "Diabetes - Management with Diet, Insulin or Drugs," 12th Annual Scientific Assembly, College of General Practice of Canada, Mexico City.

DR. J. H. CROOKSTON, "Identification of Normal and Abnormal Hemoglobins," Ontario Society of Medical Technologists.

DR. G. A. DE VEBER, "Current Status of Renal Transplantation," St. Joseph's Hospital, Hamilton; "Current Aspects of Renal Transplantation," Orillia and District Medical Society and to Humber Memorial Medical Staff, and Bracebridge and District Medical Society; "Genito-Urinary Disorders etc.," Kellogg Foundation, Port Arthur; "Management of End-Stage Renal Disease," Academy of Medicine, Anesthesia Section; "Renal Failure, Conservative Management, Hemodialysis and Transplantation," Canadian Life Insurance Medical Officers Association Convention; "Immunologic Considerations in Kidney Transplantation," Ontario Antibody Club; "Effects of Hemodialysis on Free Serum Thyroxine," European Dialysis and Transplantation Society, Dublin, Ireland.

DR. H. J. DONSKY, "Tetracycline Fluorescence in Squamous Cell Carcinoma," XIII International Congress of Dermatology, Munich, Germany; "Psoriasis," Toronto Area Pharmacists.

DR. S. DUBISKI, "Changes in the Conformation of the Heavy Chains of Rabbit Immunoglobulin which depend on the Allotypic Specificity of the Light Chains," 52nd Annual Meeting of the Federation of American Societies for Experimental Biology, Atlantic City.

DR. W. M. EAGLESON, "Some Experimental Work in Bone Healing," Orthopedic Section, Toronto Academy of Medicine.

DR. J. D. L. FITZGERALD, "Allergic Respiratory Disease," Institute of Allergy, Roosevelt Hospital, New York.

DR. N. FORBATH, "Glucose Dynamics in Patients treated with Glucocorticoid Hormones," VI Congress of International Diabetes Federation, Stockholm, Sweden.

DR. P. G. FORBATH, "Cardiac Research and the Role of the Ontario Heart Foundation," Nightingale School of Nursing, Toronto.

DR. G. G. FORSTNER, "Intestinal Surface Membrane," Ohio State University, Columbus, Ohio.

DR. W. M. FRANKS, "Electromyography," Ontario Physiotherapy Association.

DR. D. A. GORDON, "Differential Diagnosis of Arthritis," Peterborough County Medical Society; "Autoimmunity and Rheumatic Diseases," Kitchener Academy of Medicine; "The Management of Rheumatoid Arthritis," South Peel Hospital, Cooksville; "Correlation between the Rheumatoid Biologically Active Factor (RBAF) and Clinical Features of Rheumatoid Arthritis (RA)," IV Panamerican Congress of Rheumatology, Mexico City; "Amyloidosis Resembling Rheumatoid Arthritis (RA) Secondary to Multiple Myeloma with Bence Jones (B.J.) Proteinuria," Interurban Arthritis Meeting, Cleveland, Ohio.



DR. C. K. GORMAN, "Prediabetes," Canadian Workshop on Diabetes, Montebello, Quebec.

DR. H. F. HABERMAN, "Serum Tyrosinase in Mouse Melanoma," Canadian Dermatology Association, Quebec.

DR. J. B. HOUP, "On an Unusual Renal Tubular Defect," Canadian Rheumatism Association Annual Meeting, Montreal; "Hypouricemia," III Laurentian Course in Rheumatology, L'Esterelle; "Tryptophan Metabolism," Clinical Research Society, Toronto; "Tryptophan Metabolism in Rheumatoid Arthritis and Scleroderma," American Rheumatism Meeting, Baltimore, Maryland; "The Extra-Articular Manifestations of Rheumatoid Arthritis," Ontario Hospital Association and Canadian Arthritis & Rheumatism Society; "Biochemical Abnormalities in Collagen Disease," Annual Meeting, Canadian Rheumatism Association.

DR. J. G. HUMPHREY, "Acute Facial (Bell's) Palsy," International Meeting of Electromyography, Glasgow, Scotland; "Familial Periodic Paralysis," Second International Congress of Neurogenetics, Montreal, Quebec.

DR. K. N. JEEJEEBHOY, "Psychosomatic Aspects of Gastrointestinal Disease," Nightingale School of Nursing, Toronto; "Ulcerative Colitis & Crohn's Disease," St. Joseph's Hospital, Hamilton; "Tropical Sprue," Columbia Institute of Nutritional Sciences, Symposium, Haiti.

DR. J. C. LAIDLAW, "The Renin - Angiotensin System"; "Non-Endocrine Tumours and Hypercalcemia," Postgraduate Assembly of the Endocrine Society, Montreal, P.Q.; "The Diagnosis of Primary Aldosteronism," Notre Dame Hospital, Montreal, P.Q.; "The Control of Aldosterone Secretion," Chicago Medical School, Chicago, Illinois; "Glucocorticoid - Remediable Aldosteronism," Clinical Research Institute of Montreal; "The Planning of a New Medical Curriculum," New York Medical College; "Hypertension and the Adrenal Cortex," Regional Meeting, Royal College of Physicians and Surgeons of Canada, Halifax, Nova Scotia.

DR. G. A. KERBEL, "General Dermatology," Peterborough Medical Society.

DR. A. J. KERWIN, "Observations on the Diagnostic Value of Long Term Recording of Electrocardiograms," Annual Convention of Canadian Life Insurance Medical Officers Association.

DR. M. LENCZNER, "The Impact of Tropical and Parasitic Diseases on Our Civilization," Rotary Club of Toronto-Forest Hill.

DR. D. C. LEY, "Chromosomes in Leukemia," Ontario Association of Pathologists; "Pitfalls of Serum Iron Determination," Ontario Medical Association.

DR. R. L. MACMILLAN, "Red Cell Stickiness," American Society of Haematology, Toronto; "Anticoagulant Therapy," Medical Alumni Association, Academy of Medicine, Toronto; "Coronary Unit in a Large General Hospital," Ontario Medical Association Annual Meeting.

DR. J. T. MAROTTA, "Clinical Aspects of Acute Necrotizing Encephalitis," Canadian Neurological Meeting.

DR. E. A. McCULLOCH, "The Significance of Stem Cell Assays in Man and the Mouse," Mount Sinai Hospital, New York; "Control of Hemopoiesis at the Cellular Level," New York University; "Hematopoietic Precursors," Tissue Culture Association, San Juan, Puerto Rico; "Interrelationships between Hemopoietic Precursor Cells," Christie Hospital and Holt Radium Institute, Paterson Laboratories, Manchester, England; "The Capacity for Differentiation of Hemopoietic Stem Cells," Eidg. Technische Hochschule, Laboratorium für Molekularbiologie Chemischer Richtung, Zurich, Switzerland; "Virus Induction of Cancer; Heterogeneity in Tumor Cell Populations," Queen's University, Kingston, Ontario; "Studies of the Control of Erythropoiesis at the Cellular Level," American Society of Hematology Meeting, Toronto; "Differentiation in the Immunological System," Midwinter Conference of Immunologists, Houston, Texas; "Stem Cell Assays in Mice and Men," The M. D. Anderson Hospital, Houston, Texas; "Hemopoietic Stem Cells in Mice and Men," McGill University; "Repair of Radiation Injury at the Tissue Level," Federation of American Societies for Experimental Biology, Atlantic City,



New Jersey; "Potential for Differentiation of Hemopoietic Stem Cells and its Relation to Regulation," Rutgers University School of Medicine, New Brunswick, New York.

DR. W. J. MCILROY, "Current Research in Multiple Sclerosis," Multiple Sclerosis Society of Canada.

DR. M. A. OGRYZLO, "Evaluation of Laboratory Data in Rheumatic Disease," Academy of Medicine; "Interpretation of Serum Protein Abnormalities," Canadian Forces Hospital; "Vasculitis," Medical Alumni Association, University of Toronto; "Renal Factors in the Production of Hyperuricemia," Interurban Arthritis Group, Cleveland, Ohio and American Rheumatism Association, Seattle.

DR. R. L. PERKIN, "Medical Manpower in General Practice," Canadian Medical Association.

DR. J. C. RICHARDSON, "Late Assessment of Brain Injury," Montreal Neurological Society.

DR. A. RAPOPORT, "Renal Hypertension-Diagnostic Procedures," St. Joseph's Hospital, Hamilton; "Focal Proliferative Glomerulonephritis," American Society of Nephrology, Los Angeles; "Some Tactical Problems in Hypertension," Academy of Medicine, Ottawa; "Assessment of Kidney Function," Dalhousie University, Halifax.

DR. D. L. SCHATZ, "Effects of Oral Contraceptives and Pregnancy on Thyroid Function," International Symposium of Fertility, Inn-on-the-Park, Toronto; "Circadian Rhythm of Serum Free Thyroxine and Thyroxine Binding Proteins," Canadian Society for Clinical Research, Toronto.

DR. J. S. SENN, "Hemopoietic Stem Cells from Man Studies *in Vitro*," Canadian Society for Clinical Investigation.

DR. H. A. SMYTHE, "Treatment of Arthritis," Ontario Medical Association.

DR. G. STEINER, "Effects of Immunosympathectomy on the Metabolic Response of Adipose Tissue and Liver to Cold-Acclimation," Federation of American Societies for Experimental Biology, Atlantic City; "Endogenous Chylomicronemia Following Pancreatectomy," Harvard School of Public Health, Boston.

DR. J. T. SUERO, "Some Aspects of Respiratory Energetics in Pulmonary Emphysema," Toronto Gas Club.

DR. R. VOLPE, "Pathogenesis of Hyperthyroidism, Newer Techniques for the Study of Thyroid Disease," Postgraduate Medical Education Series, Queen's University, Kingston; "Newer Aspects of the Pathogenesis, Diagnosis and Treatment of Hyperthyroidism," Ontario Medical Association, Toronto.

DR. P. G. WALFISH, "Metabolic Interactions and Role of Diazoxide in Glycogen Storage Disease," Metabolic Seminar, Hospital for Sick Children; "Role of Adrenergic Receptors on the Metabolic Effects of Diazoxide," Clinical Research Society of Toronto and Toronto Diabetes Society.

DR. J. R. WHERRETT, "Analysis of Glycolipids in the Hurler Syndrome," Second Symposium on Cerebral Lipidoses, Coimbra, Portugal.

DR. K. J. R. WIGHTMAN, "Reflections on the Diagnostic Process," F. J. H. Campbell Lecture in Medicine, University of Western Ontario; "Chemotherapy of Neoplastic Disease," 5th Annual Clinical Days, Royal Alexandra Hospital, Edmonton; "Adverse Reactions to Drugs," 5th Annual Clinical Days, Royal Alexandra Hospital, Edmonton.

DR. E. D. WIGLE, "Muscular Subaortic Stenosis and Acute Valvular Regurgitation," Eleventh Annual British Columbia Cardiac Symposium, Vancouver, B.C.; "Medical Considerations in Mitral Insufficiency"; "Idiopathic Hypertrophic Subaortic Stenosis"; "Aortic Insufficiency: Indications for Operation," Postgraduate Course sponsored by American College of Physicians and the Mayo Clinic, Mayo Clinic, Rochester, Minn.

DR. D. R. WILSON, "Physiology of Diuretic Agents," Hamilton Academy of Medicine.

DR. C. R. WOOLF, "Active Pulmonary Tuberculosis in a Large General Hospital; The Present Role and Future of Acute Respiratory Units," Ontario Thoracic



Society Seventh Annual Meeting, Toronto; "The Respiratory Care Unit at the Toronto General Hospital, Twenty-Second Annual Clinical Day, Niagara Falls Academy of Medicine, Niagara Falls, N.Y.; "Treatment of Acute Respiratory Failure; The Routine Pulmonary Function Laboratory; Diagnosis and Treatment of Chronic Bronchitis and Emphysema," Regina General Hospital, Saskatchewan; "Respiratory Effects of Chronic Cigarette Smoking in Women," Canadian Thoracic Society Annual Meeting, Vancouver and American Medical Association 117th Annual Convention, San Francisco.

DR. E. R. YENDT, "Management of Recurrent Renal Calculi"; "Polyuria and the Diagnoses of Diabetes Insipidus," School of Fine Arts, University of Alberta, Banff; "Renal Calculi and Nephrocalcinosis," Postgraduate Assembly, Endocrine Society; "Renal Calculi," Queen's University, Kingston, Ontario; "Hypertension due to Pyelonephritis," Postgraduate Course on Hypertensive Cardiovascular Diseases: Mechanisms and Treatment, American College of Physicians, Montreal; "Renal Tubular Disorders," Queen's University, Kingston, Ontario; "Renal Calculi," Maisonneuve Hospital, Montreal; "Diagnosis of Hyperparathyroidism," Albany Medical College of Union University, Albany, New York.

DR. T. T. ZSOTER, "Adrenoceptive Sites in the Veins," International Congress of Angiology, Barcelona, Spain.

#### PUBLICATIONS

- ALDRIDGE, H. E., LANSDOWN, E. L., BIGELOW, W. C., *et al.* "Internal Mammary Artery Implantation for the Relief of Angina Pectoris. A Follow-up Study of 77 Patients for up to 13 Years" (*Canadian Medical Association Journal*, vol. 98, no. 4, Jan. 27, 1968, pp. 194-8).
- ALDRIDGE, H. E., and YAO, J. "Secundum Atrial Septal Defect in the Adult: Repair using Cardiopulmonary Bypass in 133 Patients" (*Canadian Medical Association Journal*, vol. 97, no. 6, Aug. 5, 1967, pp. 269-74).
- ARMSTRONG, J. B. "Perspectives of Overweight and Other Factors Related to Cardiovascular Disease" (*Canadian Journal of Public Health*, vol. 58, 1967, pp. 497-8).
- AUGER, P., and WIGLE, E. D. "Coarctation of the Aorta Associated with Severe Mitral Insufficiency" (*American Journal of Cardiology*, vol. 21, 1968, pp. 190-5).
- "Sudden, Severe Mitral Insufficiency" (*Canadian Medical Association Journal*, vol. 96, no. 23, June 10, 1967, pp. 1493-1503).
- BAIN, S. T., and SPAULDING, W. B. "The Importance of Coding Presenting Symptoms" (*Canadian Medical Association Journal*, vol. 97, no. 16, Oct. 14, 1967, pp. 953-9).
- BAUMAL, R., *et al.* "An Approach to the Study of Soluble Antigen-Antibody Complexes in Clinical Disease" (*University of Michigan, Medical Center Journal*, vol. 34, no. 1, 1968, pp. 30-6).
- BAUMAL, R., and BRODER, I. "Studies into the Occurrence of Soluble Antigen-Antibody Complexes in Disease. I. A. Biological Assay for Soluble Complexes; III. Rheumatoid Arthritis and Other Human Diseases" (*Clinical Experimental Immunology*, vol. 3, 1968, pp. 525-36, 555-69).
- BERGSAGEL, D. E. "The Chronic Leukemias: A Review of Disease Manifestations and the Aims of Therapy" (*Canadian Medical Association Journal*, vol. 96, no. 25, June 25, 1967, pp. 1615-20).
- BERGSAGEL, D. E., and PRUZANSKI, W. "The Clinical Expression and Treatment of Plasma Cell Neoplasia" (*Postgraduate Medicine*, vol. 43, May 1968, pp. 200-7).
- BERRIS, B. "Treatment of Diseases of the Liver" (*Applied Therapeutics*, vol. 10, no. 4, April 1968, p. 262).
- BERRIS, B., ROTHER, I., and ROSEN, P. S. "Telangiectases Simulating Hereditary Hemorrhagic Telangiectasia in Scleroderma: Report of Two Cases" (*Canadian Medical Association Journal*, vol. 96, 1967, pp. 1528-31).
- BHARGAVA, R. K., and WOOLF, C. R. "Changes in Diffusing Capacity after Bronchography" (*American Review of Respiratory Disease*, vol. 96, 1967, pp. 827-9).
- BRODER, I., *et al.* "Studies into the Occurrence of Soluble Antigen-Antibody Complexes in Disease. II. Criteria for Distinguishing Soluble Complexes from Other Macromolecular Histamine Releasers" (*Clinical Experimental Immunology*, vol. 3, 1968, pp. 537-53).
- CHESNIE, J. J. "Therapeutic Indications for the Use of Vitamin B<sub>12</sub> and Folic Acid in the Megaloblastic Anemias" (*Applied Therapeutics*, vol. 9, 1967, pp. 994-8).
- DUBISKI, S. "Suppression of the Synthesis of Allotypically Defined Immunoglobulins and Compensation by Another Subclass of Immunoglobulin" (*Nature*, vol. 214, no. 5095, June 1967, pp. 1365-6).
- "Synthesis of Allotypically Defined Immunoglobulins in Rabbits" (*Cold Spring Harbor Symposium on Quantitative Biology, XXXII, Antibodies*, 1967, pp. 311-16).



- DUBISKI, S., and MULLER, P. J. "A 'New' Allotypic Specificity (A9) of Rabbit Immunoglobulin" (*Nature*, vol. 214, no. 5089, May 1967, pp. 696-7).
- EAGLESON, W. M., *et al.* "The Effects of Heat on the Healing of Fractures" (*Canadian Medical Association Journal*, vol. 97, no. 6, Aug. 12, 1967, pp. 274-80).
- EDMEADS, J. G., *et al.* "Parasitic Diseases of the Nervous System in Thailand" (*Canadian Medical Association Journal*, vol. 98, no. 18, May 4, 1968, pp. 854-67).
- EZRIN, C., BRIANT, T. D. R., FIRESTONE, G., and ROSEN, F. "The Endocrine Aspects of Trans-sphenoidal Hypophysectomy" (*Canadian Medical Association Journal*, vol. 97, no. 2, July 8, 1967, pp. 72-5).
- FEINMAN, S. V. "Liver Disease - Etiological Aspects" (*Applied Therapeutics*, vol. 10, no. 4, April 1968, pp. 249-53).
- "Liver Disease - Clinical Diagnosis" (*ibid.*, pp. 254-6).
- FORSTNER, G. "Incorporation of (1-14C) Glucosamine by Rat Intestinal Microvillus Membrane" (*Biochimica et Biophysica Acta*, vol. 150, no. 4, June 1968, pp. 736-8).
- Forstner, G., *et al.* "Rat Intestinal Microvillus Membranes, Purification and Biochemical Characterization" (*Biochemical Journal*, vol. 106, no. 2, Jan. 1968, pp. 381-90).
- GORDON, D. A., *et al.* "Correlation between Rheumatoid Biologically Active Factor (RBAF) and Clinical Features of Rheumatoid Arthritis (RA)" (*Excerpta Medica International Congress Series No. 143*, vol. 25, Oct. 1967, abstract 41, p. 1; *Arthritis and Rheumatism*, vol. 10, June 1967, p. 266).
- GORDON, D. A., and OGRYZLO, M. A. "The University of Toronto Rheumatic Disease Unit Approach to Management of Rheumatoid Arthritis" (*South African Journal of Physiotherapy*, vol. 23, 1967, pp. 2-6).
- GORMAN, C. K., SALTER, J. M., *et al.* "Effects of Glucagon on Lipids and in Normal and Eviscerated Rats, and on Isolated Perfused Rat Livers" (*Metabolism*, vol. 16, 1967, pp. 1140-57).
- GREENWOOD, W. F. "Profile of Atrial Myxoma" (*American Journal of Cardiology*, vol. 21, 1968, pp. 367-75).
- GUAY, F. G., MAGNAB, I., and YENDT, E. R. "Primary Hyperparathyroidism in Osteogenesis Imperfecta" (*Canadian Medical Association Journal*, vol. 98, no. 20, May 18, 1968, pp. 960-2).
- HALL, J. E. "An Operation Frame for Spinal Fusion: A New Apparatus Designed to Reduce Haemorrhage during Operation" (*Journal of Bone and Joint Surgery*, vol. 49B, 1967, pp. 327-32).
- HART, G. D. "The Confederation Worm Token" (*Canadian Medical Association Journal*, vol. 97, no. 1, July 1, 1967, pp. 39-40).
- "Treatment of Rh Hemolytic Disease by Passive Immunization" (*Applied Therapeutics*, vol. 9, 1967, pp. 372-4).
- HASSELBACK, R., *et al.* "The Influence of Morphology on Prognosis in Acute Leukemia" (*Canadian Medical Association Journal*, vol. 96, no. 25, June 24, 1967, pp. 1610-14).
- HILL, M. E., WORTZMAN, G., and MARSHALL, B. M. "The Clinical Use of Droperidol in Pneumoencephalography" (*Canadian Medical Association Journal*, vol. 98, no. 7, Feb. 17, 1968, pp. 359-61).
- "A Treatable Form of Dementia due to Normal-Pressure, Communicating Hydrocephalus" (*Canadian Medical Association Journal*, vol. 97, no. 22, Nov. 25, 1967, pp. 1309-20).
- HOUP, J. B., and HASTINGS, D. "Surgery in Rheumatoid Arthritis" (*Journal of the Canadian Physiotherapy Association*, vol. 20, no. 2, April 1968, pp. 116-19).
- HOUP, J. B., and OGRYZLO, M. A. "Tryptophan Metabolism in Rheumatoid Arthritis and Scleroderma" (*Arthritis and Rheumatism*, vol. 11, no. 1, Feb. 1968, p. 103) (abstract).
- HOWES, D. C., and WHERRETT, J. R. "The Occurrence of Inosine in Unwashed Lipid Extracts" (*Lipids*, vol. 3, no. 2, 1968, pp. 185-6).
- JUNG, M. A., SELBY, A., JOHNSON, J. R., BEANLANDS, D. S., and LENKEI, S. "The Value of a Cardiac Arrest Team in a University Hospital" (*Canadian Medical Association Journal*, vol. 98, no. 2, Jan. 13, 1968, pp. 74-8).
- KECHARANANTA, P., and WOOLF, C. R. "Active Pulmonary Tuberculosis in a Large General Hospital" (*Canadian Medical Association Journal*, vol. 98, no. 1, Jan. 6, 1968, pp. 30-3).
- KLEIN, S. W., MORCH, J. E., and MAHON, W. A. "Cardiovascular Effects of Glucagon in Man" (*Canadian Medical Association Journal*, vol. 98, no. 25, Dec. 22, 1968, pp. 1161-5).
- KOFMAN, O., and TASKER, R. "Ipsilateral and Focal Inhibitory Seizures" (*Neurology*, vol. 17, no. 11, Nov. 1967, pp. 1082-6).
- LAIDLAW, J. C. "Adrenal Cortical Insufficiency"; in *Current Therapy*, ed. H. F. Conn, pp. 412-14. Philadelphia: W. B. Saunders, 1968.
- LINTON, W. T. "Hair and Scalp" (*Applied Therapeutics*, vol. 10, no. 4, April 1968, pp. 265-8).
- "Syphilis Therapy" (*Applied Therapeutics*, vol. 9, 1967, p. 529).
- MACMILLAN, R. L., and BROWN, K. W. G. "Arrhythmias in Acute Myocardial Infarction" (editorial, *Canadian Medical Association Journal*, vol. 97, no. 12, Sept. 16, 1967, p. 752).
- MACMILLAN, R. L., BROWN, K. W. G., *et al.* "Changing Perspectives in Coronary Care - A Five Year Study" (*American Journal of Cardiology*, vol. 20, no. 4, 1967, pp. 451-6).
- MACMILLAN, R. L. (with Professor MONKHOUSE) "The Coagulation (Clotting) of Blood"; in



- The Physiological Basis of Medical Practice*, 8th ed., ed. Charles H. Best and Norman B. Taylor, pp. 585-93. Baltimore: Williams & Wilkins, 1966.
- McILROY, W. J. "Symposium on Extrapyrarnidal Disease. Medical Aspects" (*Applied Therapeutics*, vol. 9, May 1967, pp. 451-3).
- MEINDOK, H. "Diagnostic Significance of Hypoalbuminemia" (*Journal of the American Geriatric Society*, vol. 15, Nov. 1967, pp. 1067-71).
- OGRYZLO, M. A. "Rheumatology - The New Horizon" (*University of Toronto Medical Journal*, vol. 45, 1968, pp. 86-7).
- "Systemic Lupus Erythematosus" (*The 3rd Pfizer International Symposium, Rheumatic Disease*, Edinburgh, May 17-19, 1967).
- OGRYZLO, M. A., GORDON, D. A., and SMYTHE, H. A. "The Rheumatic Disease Unit (R.D.U.) Concept" (*Arthritis and Rheumatism*, vol. 10, no. 5, 1967, pp. 479-85; *Journal of the Canadian Physiotherapy Association*, vol. 20, 1968, pp. 90-6).
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## OBSTETRICS AND GYNAECOLOGY

*Under the direction of Professor W. M. Paul*

During the past year, members of the Department have been active in producing the basis of a new curriculum in Reproduction and Neonatology. Details have now been worked out to the point that specific members have been assigned specific



portions of this new curriculum to prepare. More difficult than the designing of the new curriculum is the planning with regard to resources in patients, teaching beds and teachers to implement this in the face of a rising enrolment. This has been a major task, particularly for the Department Heads of the various units. Projections of plans for this Department have been made with regard to staff, facilities, required teaching unit admissions and beds. In addition, an overall plan of research activity and distribution of research facilities in this clinical Department has been made. Our basic philosophy in this regard is that each clinical department must have a research component in order to retain its viability. It is also our plan to make sure that the research effort is not duplicated within the Department.

Planning for a curriculum change presents enough difficulties on its own. If we couple this with an increase in enrolment, decisions or requests with regard to expanded clinical and research facilities, the participation of other branches of government in funding the Medical School, and the projected effect of a total Medicare scheme on a teaching system, it is not surprising that we are disappointed in our ability at times to be precise in our projections. Decisions with regard to the distribution of resources in the Medical School have not yet been undertaken. This may be understandable in that these decisions are taken neither easily nor hastily. However, it is fair to say that the need to plan without a fairly precise knowledge of the resources available has produced an attitude of frustration and impatience among the staff.

The Department of Obstetrics and Gynaecology at the New Mount Sinai Hospital became a teaching department during this year. Doctor L. J. Harris was appointed Assistant Professor in the Department and continues as the Chief at the New Mount Sinai Hospital. This Department will bring with it a valuable resource in undergraduate education.

Our postgraduate clinical programme was altered only slightly during the past year.

Doctor T. J. Gregor and Doctor Z. J. Makkay successfully passed the examinations for Fellowship in the Royal College of Surgeons of Canada and Doctor Carol Cowell was certified by the Royal College of Surgeons.

A refresher course for general practitioners was held in February.

The Department was pleased to welcome Doctor J. W. Goodwin and Doctor J. E. Milligan as full-time appointees in the Women's College Hospital. Both Doctors Goodwin and Milligan have a particular research interest in foetal physiology and consequently have been located within the same unit. Their research programme is under way and facilities in the new building at that Hospital will house this activity.

Doctor Rudi Borth of the Maternity Centre, Geneva, Switzerland, joined our Department with the rank of Associate Professor, and a cross-appointment with the Department of Medicine. Doctor Borth's activity is being undertaken in St. Michael's Hospital in association with Doctor C. A. Woolever.

Doctor J. H. Whiteside will soon complete his period of training at the Bowman Gray School of Medicine, North Carolina, and return to the Department.

A particularly happy occasion was the institution of the D. Nelson Henderson Lectureship in the Department of Obstetrics and Gynaecology. The first Henderson Lecturer was Doctor J. D. Woodruff, Department of Obstetrics and Gynaecology, Johns Hopkins Medical School. The Department looks forward to many happy returns of this event.

Doctor R. H. Wesley has been granted leave of absence from our Department in order to assume the post of Professor of Obstetrics and Gynaecology at Ahmadu Bello University, Zaria, Northern Nigeria.

Doctors Crawford Shier and J. W. Rogers have resigned from our Department in order to join the Department of Obstetrics and Gynaecology at North York General Hospital. This new suburban Hospital has developed its staff in close relationship to the University. The long service and effective contribution of Doc-



tors Shier and Rogers to our Department is gratefully acknowledged and our best wishes go with them in their new posts.

Dr. W. M. Paul was an M. R. C. Visiting Professor at the University of Manitoba in October.

The Department has been honoured by visits and contributions from Professor J. H. M. Pinkerton, Belfast, Northern Ireland; Mr. W. R. Winterton, The Middlesex Hospital, London, England; Doctor J. D. Woodruff, Johns Hopkins Medical School, Baltimore, Maryland; Doctor Clyde Randall, State University of New York at Buffalo, N.Y.; Doctor J. C. S. Spry-Leverton, Lincolnshire, England; Doctor J. A. Chalmers, Worcester, England; Professor Lance Townsend, University of Melbourne, Australia; and Doctor Mary Coyle, Dundee University, Scotland.

The year has seen a continued expansion in our staff, in their research endeavour and their research facility. Considerable advances have been made in curriculum planning and in long-term projections for total activity. This has placed increasing demands on the members of this Department and they have responded with warmth and with enthusiasm. For this, they have my grateful thanks. The support of Dean Chute, particularly his assistance in providing facilities and equipment for our expanding staff, is very much appreciated.

#### RESEARCH

Dr. P. F. Beirne is initiating the evaluation of ultra sound, both A-scan and V-scan, as a diagnostic tool in Obstetrics and Gynaecology.

Dr. Rudi Borth's current activities include a study of the fluorometric assay method for urinary estrogens, the evaluation of comparative assays of HCG by biologic and immunochemical methods, and the radio-immuno-assay technique for gonadotrophins.

Dr. S. L. Cohen continues his studies of estrogen excretion during pregnancy.

Dr. T. A. Doran continues his clinical investigation in the area of Rh immunization. He is also studying the efficiency of uterine lavage techniques for the detection of endometrial carcinoma in asymptomatic women. In conjunction with Dr. P. Conin, a study is beginning on chromosomal analysis from cultured amniotic cells obtained by amniocentesis. This study is in particular relation to suspected chromosomal abnormalities in utero.

Dr. D. J. Gare is assessing the foetal state during labour, with particular regard to acid-base status and the effectiveness of oxygenation.

Dr. J. W. Goodwin and Dr. J. E. Milligan have begun studies on the circulation and general metabolism of the foetal lamb in interim facilities for large animal research at the former Ontario Research Foundation on Queen's Park Crescent. This work includes studies in cardiac output and foetal cerebral gangliocides in anoxic states.

In conjunction with Dr. Brian Cookson, Department of Psychiatry, Dr. P. Riffel, Department of Psychology, and Dr. Harding LeRiche, Department of Epidemiology and Biometrics, Dr. J. A. Harper has initiated a study to explore the psychosocial aspects of the menopause.

Dr. J. E. Morgan is conducting a clinical research programme in the mechanisms of female urinary incontinence and the rationale of their correction.

Dr. L. W. Organ is continuing his investigations in foetal electrocardiography. The past year has seen the development of a reliable and practical monitoring system. Development is beginning on a practical intrauterine transducer for the measurement of uterine activity during labour.

Dr. T. G. Ryley continues his interest in chromosome determinations in relation to congenital anomalies and problems in intersex.

Dr. G. Urbach's activities include studies of immunologic responses to placental tissue and the role of maternal lymphocytes in embryonic rejection.

Dr. Richard Wilson's investigations involve study of the metabolic activity of



the foetal-adrenal cortex and patterns of excretion during normal and complicated pregnancies. In addition, he has undertaken, with the help of a National Health grant, the investigation of health care delivery systems in the economically deprived urban areas. The long-term project he directs on the physiological and psychological effects of replacement therapy at the menopause continues. Dr. Wilson conducts this activity in the Department despite the fact that his major contribution to the University has been as Director of the Health Sciences Functional Planning Unit during the past year.

#### HONOURS

DOCTOR W. M. PAUL was elected a Fellow of the Royal College of Obstetricians and Gynaecologists of London, England, and a member of the American Gynecological Society.

DR. S. L. COHEN was the winner of the Annual Award of the Society of Obstetricians and Gynaecologists of Canada for a paper entitled "A Method for the Rapid Colorimetric Assay of Total Estrogen in Pregnancy Urine."

DR. M. L. BUNKER was appointed Chairman of the Medical Advisory Committee of the Canadian Cancer Society, Ontario Division.

DR. J. H. WHITESIDE continued a McLaughlin Fellowship for study in the United States.

DR. J. R. COLWILL was awarded a Medical Research Council Fellowship for further study at the University of Colorado.

#### SCHOLARLY ADDRESSES

DR. J. E. MILLIGAN, "Vasomotor Responses in the Hind-limb of Newborn Calves," Canadian Federation of Biological Sciences, Montreal, July 1967.

DR. C. P. VERNON, "Progesterone Therapy in Metastatic Endometrial Carcinoma," The Society of Pelvic Surgeons, Toronto, September 1967.

DR. D. L. SHAUL, "Radioisotope Localization of the Placenta and the Management of Antepartum Bleeding," American College of Obstetricians and Gynecologists, Indianapolis, Indiana, September 1967.

DR. R. WILSON, "Simulation Analysis in Health Sciences Resource Allocation," Association of Hospital Directors of Medical Education, Fall Teaching Institute, Montreal, September 1967.

DR. J. E. MILLIGAN, "Neutral Control of Pulmonary Circulation in the Foetal Lamb by a Cross-Circulation Technique," American Heart Association, San Francisco, October 1967.

DR. J. W. GOODWIN, "The Effect of Graded Reductions of Umbilical Blood Flow on Individual Ventricular Outputs in the Foetal Lamb," Canadian Society for Clinical Investigation, Toronto, January 1968.

DR. J. E. MILLIGAN, "Vasomotor Responses in the Hind-limb of the Foetal Lamb," Canadian Society for Clinical Investigation, Toronto, January 1968.

DR. J. H. WHITESIDE, "Myometrical Effects of Altered Vascular Pressure in the Castrate Monkey," The Royal College of Physicians and Surgeons of Canada, Toronto, January 1968.

DR. W. M. PAUL, "Hormonal Therapy in the Menopause and Post-Menopause"; "The Acute Abdomen in Pregnancy"; "The Role of Scalp Sampling Techniques in Labor"; 37th Annual Conference, Dallas Southern Clinical Society, "Visiting Faculty," Dallas, Texas, March 1968.

DR. R. WILSON, "Systems Analysis in Health Sciences Educational Planning," Canadian Association of Medical Colleges, Executive Committee, and the Deans of Canadian Medical Schools, Ottawa, April 1968.

DR. R. WILSON, "Systems Analysis of Alternative Designs of a Faculty," Organization for Economic Cooperation and Development, Directorate for Scientific Affairs and Educational Management Techniques, Paris, France, April 1968.



DR. W. M. PAUL, "Is Scalp Sampling Useful?" Milton A. Darling Memorial Lecture, Wayne State University, Detroit, Michigan, May 1968.

DR. R. BORTH, "Newer Developments in Gonadotropin Assay"; DR. P. F. BEIRNE, "Diagnostic Uses of Ultra Sound in Obstetrics and Gynaecology," Ontario Medical Association, Toronto, May 1968.

DR. C. LUTTOR, "Viral Infection in Pregnancy," Ontario Medical Association, Toronto, May 1968.

DRS. M. N. KROCH and S. L. COHEN, "Serial Urinary Oestrogen Assays in the Management of the Diabetic Pregnancy," VI World Conference on Fertility and Sterility, Tel Aviv, Israel, May 1968.

DR. W. J. HANNAH, "The Problem of Prolonged Labour"; "Myths in Obstetrics and Gynaecology"; Regional Meeting, Royal College of Physicians and Surgeons of Canada and Atlantic Society of Obstetricians and Gynaecologists, Halifax, May 1968.

DR. F. R. PAPSIN, "Colposcopy - Yes or No?"; DRS. J. L. M. BEAN, J. C. G. WHETHAM and C. P. VERNON, "Results of Surgical Treatment of Carcinoma of the Cervix"; DR. J. E. MILLIGAN, "The Effect of Pretreatment with Hyperbaric Oxygen on the Response to Anoxia and Survival on Resuscitation in Newborn Rabbits"; DRS. R. WILSON, M. N. KROCH and S. L. COHEN, "Serial Urinary Oestrogen Assays in the Management of the Diabetic Pregnancy"; The Society of Obstetricians and Gynaecologists of Canada, Ste. Adele, Quebec, June 1968.

#### PUBLICATIONS

BORTH, R. "Endocrinology of the Human Menstrual Cycle: Opinions and Hypotheses" (*Vitamins and Hormones*, vol. 25, 1967, pp. 123-35).

——— "Gonadotrophin-Steroid Interrelationships"; in *Proceedings of the 5th World Congress of Gynecology and Obstetrics*, Sydney, Australia, 1967, pp. 230-9.

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——— "Neural Control of Pulmonary Circulation in the Fetal Lamb as Studied by a Cross-circulation Technique" (*Circulation*, vol. 36, no. 4, supp. II, Oct. 1967, p. 80) (abstract).

——— "Pulmonary Vasoconstriction in Asphyxia during Cross-circulation between Twin Fetal Lambs" (*Journal of Physiology*, vol. 192, 1967, pp. 111-21).

——— "Vasomotor Responses in the Hindlimb Circulation of Fetal Lambs" (*Circulation*, vol. 36, no. 4, supp. II, Oct. 1967, p. 96) (abstract).

——— "Vasomotor Responses in the Hindlimb of Newborn Calves" (*Circulation Research*, vol. 21, Aug. 1967, pp. 237-44).

——— "Vasomotor Responses in the Hindlimb of Newborn Calves" (*Proceedings of the Canadian Federation of Biological Sciences*, July 1967, p. 25) (abstract).



- "Vasomotor Responses in the Hindlimbs of Fetal and Newborn Lambs to Asphyxial and Aortic Chemoreceptor Stimulation" (*Journal of Physiology*, vol. 195, 1968, pp. 55-81).
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## OPHTHALMOLOGY

*Under the direction of Professor Clement McCulloch*

The Department of Ophthalmology contributes to the undergraduate training programme during the third and fourth medical years. Dr. Lois Lloyd is in charge of the course for the third year. In that year the time is spent in small clinics looking at ocular fundi. The students familiarize themselves with the ophthalmoscope, the normal structures of the fundus and gain some comprehension of the pathological changes that may occur. In the fourth year the students attend lectures and clinics designed to show some of the common ophthalmic conditions and to give a survey of the medical responsibilities of the specialty. The Department is searching for valid examination procedures.

The graduate programme in the Department is extensive and takes much of the time of the staff. The programme is of three years' duration. It is highly structured and meets the requirements of the Royal College of Physicians and Surgeons of Canada for the Specialty.

The first year centres on the laboratories at 1 Spadina Crescent. The students have three responsibilities which, in their order of importance, are: (1) education; (2) an investigative or research project; and (3) certain minor service commitments. The students receive approximately four lectures a week during the academic year and have regular examinations that are of both multiple choice and essay type. In addition, they receive regular assignments from the Professor's Office, which are modelled after the Harvard Business School procedures: turned in at appointed dates, marked by the staff and returned to the student. Each first-year man presents a report of his project at the Annual Research Meeting of the Department where he is in competition for the John Gaby Prize. If suitable, the presentations are published in an ophthalmic journal. The whole teaching staff of the Department participates in this programme and we draw heavily from other departments, including Anatomy, Pathology, Bacteriology and Pharmacology.

During their second and third years the students work at the five University teaching hospitals as Assistant Residents in the Ophthalmology Service. During their second year the programme of didactic instruction and examinations is continued, with the theme centring on medical ophthalmology. The programme continues on the same lines in the third year with the emphasis on surgical ophthalmology. In the final year the men are responsible for the work schedules at each hospital, ward rounds and other scientific assignments. The third-year men give a clinical paper at the Clinical Day in competition for a prize presented by the Eye Department Alumni. The service load during the clinical years is heavy. Supervision by staff is continuous with each resident easily fulfilling the Royal College requirements for the Specialty.

The following first-year men were supported through the Departmental budget: Drs. J. R. Buncic, R. M. Zahoruk, W. S. Dixon, W. M. Easterbrook, T. P. Prawak, J. Cardarelli, E. V. Rafuse, D. G. Middleton, B. P. Sniderman and R. D. West. Dr.



A. J. Krebes was supported by the Edward Christie Stevens Foundation. This pattern of support is in divergence from previous years, when the first-year students were supported through the Canadian National Institute for the Blind and research grants. The present programme is much more realistic and clearly defines the central theme of training in the specialty.

The second-year men rotating through the teaching hospitals are as follows: Drs. G. J. Johnson, P. D. Chubb, M. Cooper, D. R. Smith, C. G. Falkner, M. Priest and S. S. Smith.

The third-year students completing their programme during this academic year are: Drs. W. A. Allin, B. Craig, F. Feldman, G. M. Somerville, B. Newbigin, J. Cardarelli and E. V. Rafuse.

Dr. N. W. Hindle has completed a special residency at the Hospital for Sick Children and has been active in developing electromyography in the Department.

Dr. F. Feldman has received an Ontario Training Scholarship in support of a year of study with Dr. S. M. Drance in Vancouver on glaucoma. Following his year of advanced training, he will return to the staff of New Mt. Sinai Hospital.

Drs. J. A. Parker and J. R. Miller successfully passed the Fellowship examinations of the Royal College in Ophthalmology. Drs. D. H. Dickson, J. R. Elder, J. E. Graham and J. K. Warnica received the Certificate in Ophthalmology from the Royal College.

Dr. J. A. Parker completed his year as a McLaughlin Fellow at the Institute of Optics in Rochester. He returned to the University staff July 1, 1967, and has been very active in the teaching of optics and physiology to the graduate students.

The annual Eye Surgery Clinical meeting was held March 21 and 22. The programme was devoted to the subject of glaucoma and was under the direction of Dr. J. S. Speakman. The two guests of honour were Professor C. I. Phillips of Manchester, England, and Dr. S. M. Drance of the University of British Columbia. The meeting was well attended. On the Saturday morning following the course a special meeting on research problems in glaucoma was held. This, combined with the course, gave a thorough review of all aspects of the subject. The guest speaker at the course banquet was Mr. Douglas Wilkinson, who gave a description of the Canadian Arctic and the role of the Eskimo in his changing world.

On January 25 and 26 a course in Ophthalmology for General Practitioners was given by the Department under the direction of Dr. J. W. Hiltz. This course continues to be successful and to attract a good number of practitioners. This year twenty-five of the staff were employed in the presentations. Live material was used as much as possible, and an attempt was made to give exact details of diagnostic procedures and therapeutic management of cases.

The Tenth Walter Wright Lecture was held on February 16. Dr. Alfred J. Elliot, Professor of Ophthalmology at the University of British Columbia and previous Chief of Ophthalmology in Toronto, gave the Walter Wright Lecture. His subject was "Recent Advances in the Diagnosis and Management of Macular and Paramacular Tumours." The rest of the day was given over to papers from the alumni and clinical staff. On the following Saturday morning a Grand Ward Rounds was held on the practical demonstration of fluorescein ophthalmoscopy. This was widely attended. During the rounds, the first Toronto demonstration of the actual ocular fundus was shown on television.

The Annual Departmental Research Meeting and Clinical Day were held April 26 and 27. Dr. David D. Donaldson, Associate Clinical Professor of Ophthalmology, Harvard Medical School, was the guest of honour for the Clinical Day. He spoke on "Tumours and Cysts of the Conjunctiva" and "Pathognomic Findings in the Eye of Systemic Disease." The senior residents presented papers of a clinical nature and Dr. B. Newbigin was the winner of the Alumni Prize for his paper on "Hazards in the Use of Phenylephrine in Intraocular Surgery." A number of the clinical staff also presented papers.

Dr. Herbert E. Kaufman, Professor of Ophthalmology at the University of



Florida in Gainesville, was the guest of honour at the Research Meeting. He spoke on "Mechanisms of Recurrent Herpes Simplex Keratitis" and "Problems with Surgery in the Eye with Corneal Dystrophy." A number of the research staff and the first-year students presented their work. The John Gaby Prize for the best paper by a first-year Fellow was awarded to Dr. W. M. Easterbrook for his paper on "Disinfection of ocular prosthesis." Other guests who participated in the meeting included Dr. M. Kaur of the Department of Anatomy who discussed "Determination of Dimensions of the Lacrimal Sac," Dr. W. K. Noell of Buffalo who described "The Role of Vitamin A in Experimental Retinal Pathology," Dr. C. R. Braekevelt of London, Ontario, whose subject was "Development of Retinal Pigment Epithelium in the Albino Rat," and Dr. R. Cosentino of Buffalo who discussed "Hyperbaric Oxygenation and Post Therapy Myopia." Mr. N. K. Sinha of Shawa presented a "Study of Corneal Birefringence by Scattered Light Technique."

The Research Day continues to be an important phase in the activity of the Department and gives the staff of the Departmental laboratories an opportunity to bring together their work for presentation.

During the year the Department has been consolidating its work in the laboratories at 1 Spadina Crescent. It is surprising the number of problems that arose on moving into new space, such as reorganization of equipment, starting again on projects that were broken due to disruption at the time of moving. Some X-ray equipment has been received and installed and has been used for a study of aging of retinal blood vessels. All the branches of the laboratory are again functioning. The Eye Bank has organized its activities from the new address. The residents have recommenced their studies on animals in conjunction with clinical problems in the hospitals on ocular pressure, immunology and pathology. As is inevitable, the Department is still looking for space. With the return of Dr. Parker, specific optical space becomes necessary. It is hoped to move the Departmental offices to space near the laboratories. The planning of the research programme continues to be under the direction of Professor P. K. Basu.

One of the important developments during the year was the expansion of the work done in the teaching hospitals. A new clinic is under construction at Sunnybrook Hospital which will provide individual examining rooms and greatly improve facilities offered to patients. Ward space used by the Department is being moved. The area to be occupied will bring the work areas of the Eye Department in close proximity and will be a great help. At St. Michael's Hospital renovation of the Eye Clinic has now been largely completed and is easily the best eye facility in the city and compares favourably with that in any other centre. New equipment in the unit allows the Hospital to give much better service to patients. We are now using research laboratories in the Hospital. At the Hospital for Sick Children special research space has been used by the Department in the study of infectious diseases and also for development of electromyography. The Orthoptic Clinic is being formed into an Orthoptic School and will form an important part of the facilities offered to patients.

The Ophthalmic Pathology Laboratory has continued to be busy at its new location at 1 Spadina Crescent. One hundred and ninety specimens have been received during the year for study. The laboratory also processes any research pathology that is required by the staff members, the number this year being 437. Teaching sessions are given to the postgraduate students in the pathology laboratory. The staff also contributed to the Canadian Eye Pathology Study Club and Drs. Hunter, Speakman, Shea and McCulloch presented material from the Department at the Study Club session in Winnipeg.

The Department would like to thank the many groups who have helped during the year, including the Canadian National Institute for the Blind and the E. A. Baker Foundation who have been most willing to give support. Mrs. H. B. Stapells and her family have continued to contribute to the Eye Department through the Stapells Fund, which has supported the work of Dr. John Parker. We have also received help



from the Selkirk Fund, which has been the basis for our staff to visit other centres and keep abreast of current work. The Alumni have continued to support the Department, both in the publication of the weekly newsletter that goes to all ophthalmologists in the Province, and by helping the resident staff to go to meetings to give papers. The Ontario Geriatric Society has given us a generous grant toward the further study of aging of retinal vessels and The Independent Order of Odd Fellows has given us a grant toward the support of Dr. Y. Matuk's work on the biochemistry of the retina and cornea. Small donations continue to come in and are much appreciated.

#### RESEARCH

Under a Medical Research Council grant entitled "Biochemical and Immunological Studies on the Cornea," Dr. P. K. Basu, together with Drs. B. Zucker, J. Cardarelli and B. P. Sniderman, Mr. F. Carre and Mrs. I. Fielding, continued studies on the immunological problems related to corneal transplantation. Under this grant Dr. Y. Matuk, assisted by Mrs. E. Marai, continued his research on the protein metabolism of the cornea. Under the National Health grant "Artificial Cornea," Drs. Zucker and Basu continued their work on the development of artificial cornea for the treatment of corneal opacities, with the co-operation of Mr. F. Sanger, of the Contact Lens Centre, Toronto. Mrs. A. Wolf is continuing her work as Executive Secretary of the Eye Bank of Canada (Ontario Division). Since the beginning of the Eye Bank programme in 1955, 3,239 eyes have been donated and 1,471 have been used for corneal transplantation. The total number of people who have signed donor cards pledging their eyes is 39,000. The Eye Bank is a joint project with the Canadian National Institute for the Blind and is under the direction of Dr. G. A. Thompson. Since April 1966 the Eye Bank Laboratory in the University of Toronto, under the direction of Dr. Basu, has been financially supported by the Ontario Hospital Services Commission. Operated by Mrs. Wolf and Mrs. Fielding, this laboratory deals with the selection and sterilization of donor eyes. Dr. Basu and Mr. Carre have completed a project on the use of DMSO in the preservation of corneal tissue, and a bacteriological study on the sterility of the donor eyes is currently in progress with the assistance of Dr. P. Tuffnell of the Toronto General Hospital. The Corneal Research Clinic continues to operate twice monthly at the Toronto General Hospital under the guidance of Dr. G. A. Thompson.

With the support of a Medical Research Council grant entitled "Biosynthesis of Proteins in the Retina," Dr. Y. Matuk and Mrs. T. Nguyen are working on the mechanism of protein synthesis in the retina.

Drs. M. Shea and E. V. Rafuse are working under National Health grant "Clinical Investigation of Idiopathic Retinal Detachment" on the development of a device for the fixation of the eye ball during intraocular surgery using cryosurgical methods. Under the same grant, Dr. C. B. Mortimer assisted by Dr. R. D. West, is working on photocoagulation of diabetic retinopathy and the influence of fluorescein injection on the coagulation. Dr. L. Chisholm, aided by Dr. T. P. Prawak, is studying the effects of fibrinolysin on the vitreous.

Under a National Health grant "Diabetic Retinopathy, Its Prevention and Treatment," Dr. H. R. Hausler, with Dr. T. M. Sibay, Miss B. Stachowska and Dr. J. R. Buncic, is studying the effects of x-radiation on the ocular blood vessels in alloxanized mice. With the assistance of a grant from the Medical Research Council entitled "Studies on the Aging Process of the Chorio-Retinal Vascular Systems" and a grant from the Ontario Geriatric Research Society, Drs. Hausler and Basu are studying the effects of aging on the ocular blood vessels in animal and human eyes. Dr. Hausler is also conducting a clinical investigation at the Toronto Western Hospital on "Efficacy of Complamin in Diabetic Retinopathy."

Dr. J. S. Speakman and Dr. W. S. Dixon have studied the effect of glaucoma medications singly and in combination on the pupil size and have developed a tech-



nique for measuring pupil area, under a National Health grant entitled "Prevention of Blindness from Glaucoma." Dr. Speakman has also completed a study of patients suffering from combined glaucoma and has reviewed his experience with early aphakic glaucoma following cataract extraction. The Glaucoma Clinic continues to function at the Toronto General Hospital under Dr. Speakman's direction. Also at the Toronto General Hospital and under Dr. Speakman, the Tonometer Testing station continues to operate under the supervision of Miss T. Fredette. Drs. R. K. MacDonald and R. M. Zahoruk, under the same National Health Grant, studied the elevation in intraocular tensions in rabbit eyes following topical application of steroids. Dr. MacDonald also continued his work on the development of seton strips for producing artificial drainage of aqueous in cases of uncontrolled glaucoma. Dr. J. D. Morin continued his glaucoma research at the Glaucoma Clinic at St. Michael's Hospital, using fluorescein photography.

Dr. Basu, assisted by Mr. G. Lysis, is studying the effects of air and water pollution on ocular structures, aided by a National Health grant entitled "Effect of Environmental Pollution on the Eye."

Under a grant from the Defence Research Board, Drs. C. McCulloch, J. A. Parker and D. G. Middleton have been working on quantitative evaluation of parameters influencing extraction of data from a noisy target by stereopsis. Dr. Parker is also making a computer analysis of spherical aberration of the eye. With the aid of a Medical Research Council grant, "Analysis of Variations in the Refractive Index of Aqueous Humour," he is working on determining aqueous humour refractive index variation in inflamed eyes.

The clinical staff of the Department have undertaken a number of studies in fields related to their clinical interests. Dr. Joseph C. Hill is working on a device for the treatment of lagophthalmos using palpebral spring. With the assistance of Dr. W. M. Easterbrook and Dr. P. Tuffnell of the Toronto General Hospital, he is also studying the problems of disinfection of the ocular prosthesis. With the assistance of Dr. M. Kaur and Dr. R. G. MacKenzie of the Department of Anatomy, Dr. Hill has also completed an investigation of the determination of dimensions of the lacrimal sac. Drs. J. S. Crawford, R. D. West and Dr. Basu have been working on the nature and fate of fascia implantation and its use in ophthalmic surgery. Dr. Crawford is also studying the ophthalmic findings in Marfans syndrome.

Dr. H. M. Macrae, aided by Dr. B. Newbigin, has completed a study on the family history of Von Hippel-Lindau disease. Dr. Slatt studied ocular complications of phenothiazide derivatives. Dr. D'Arcy Macdonald continues his work on aids for the partially sighted. Dr. M. Arstikaitis is continuing her work on the follow-up of premature babies treated with oxygen and cases of Stevens-Johnson syndrome. Dr. W. S. Hunter studied a case of unexpected regression of retino-blastoma, and, with Dr. A. J. Krebes, he commenced a project on ultrasonography at St. Michael's Hospital. Dr. L. A. Lloyd, with Dr. N. W. Hindle, studied ocular electromyography in children. Dr. Lloyd is also continuing her work on the ocular complications in abnormal calcium metabolism and her research into neuro-ophthalmological problems at the Eye Clinics of the Hospital for Sick Children and Toronto General Hospital. Dr. M. Shusterman is continuing his clinical research on the problems on retina and vitreous, and intraocular lenses for aphakia. Dr. J. J. Kazdan is studying uveitis problems in children.

With the co-operation of Drs. S. Bateson and Mr. N. Sinha of Duplate of Canada Limited, Oshawa, Dr. P. K. Basu and Mr. G. Heller have recently studied corneal birefringence using scattered light technique. Dr. G. A. Thompson has studied the use of beta therapy in pterygium. Dr. B. Teichman is working on the problems of optic neuropathy. Dr. W. P. Callahan is continuing work on his lacrimal pressure test. Dr. Clement McCulloch, with Dr. S. S. Smith, has been making a study of effective treatment for *Demodex folliculorum palpebrarum* and, with Dr. D. G. Middleton, has been making an enquiry into characteristics of sutures, particularly fine sutures.



The following clinical investigations have also been carried out: Dr. G. M. Somerville completed a ten-year survey on the complications of retinal detachment surgery. Dr. F. Feldman analysed the results of cataract extraction in the presence of chronic simple glaucoma. Dr. B. Craig reviewed the incidence of orbital cellulitis. Dr. W. D. Allin reported on tension tonography. Dr. B. Newbigin studied the hazards in the use of phenylephrine in intraocular surgery and Dr. N. W. Hindle studied the pathogenesis of amblyopia.

#### HONOURS

DR. CLEMENT McCULLOCH is Editor of the *Transactions of the American Ophthalmological Society* and a Member of that Society. He is Chairman of the Medical Advisory Board of the Toronto General Hospital.

DR. H. M. MACRAE received a Centennial Medal.

DR. J. S. CRAWFORD is President of the Canadian Ophthalmological Society and Chairman of the Canadian Orthoptic Council. He is a representative of the American Academy of Ophthalmology and Otolaryngology to the American Orthoptic Council.

DR. G. A. THOMPSON was named National Ophthalmic Consultant of the Canadian National Institute for the Blind, in addition to his position as Medical Director of the Eye Bank of Canada (Ontario Division). He is also Chairman of the Eye Bank Committee of the Canadian Ophthalmological Society.

DR. MICHAEL SHEA received membership in the Retina Society of North America and served as Visiting Medical Research Council Professor at the University of Alberta.

DR. W. S. HUNTER was Chairman of the Academy of Medicine, Section of Ophthalmology, Toronto, and was awarded the "Needle" for 1966-67.

DR. P. K. BASU was selected as one of the patrons of the Editorial Board of the *Indian Journal of Ocular Pathology*. He was appointed Associate Medical Director of the Eye Bank of Canada (Ontario Division).

#### SCHOLARLY ADDRESSES

DR. CLEMENT McCULLOCH, "Why Filtering Blebs Fail," Section of Ophthalmology, New York Academy of Medicine; "The Surgical Bleb - When It Succeeds and When It Fails," Minnesota Academy of Ophthalmology and Otolaryngology; "Elasticity of Sutures, Particularly Fine Sutures," II International Symposium on Microsurgery of the Eye, Burgenstock, Switzerland.

DR. J. S. CRAWFORD, "Testing of Vision in Pre-school and School Children," School of Hygiene, University of Toronto.

DR. JOSEPH C. HILL, "Entropion," American Academy of Ophthalmology and Otolaryngology Meeting, Chicago; "Hygiene and Sterile Technique for the Ocularist," American Society of Ocularists, Chicago; "Bacterial Decontamination of Polymethyl Methacrylate in Ophthalmology," Canadian Ophthalmological Society, Ottawa.

DR. C. B. MORTIMER, "Photocoagulation of Unusual Retinal Lesions," Section of Ophthalmology, New York Academy of Medicine.

DR. MICHAEL SHEA, "Complications of Cryotherapy in Retinal Detachment Surgery," VIII Pan American Congress of Ophthalmology, Mar del Plata, Argentina; "Prophylactic and Therapeutic Cryopexy in Retinal Detachment," Buffalo Medical Society; "Lectures on Various Aspects of Retinal Detachment," Department of Surgery, Section of Ophthalmology, University of Alberta.

DR. J. S. SPEAKMAN, "Combined Glaucoma," Postgraduate seminar on Glaucoma, Kingston.

DR. P. K. BASU, "Studies on Mechanisms of Corneal Graft Reactions Using Superficial Systems," II International Corneo-Plastic Conference, London, England.

DR. W. S. HUNTER, "Hemolytic Glaucoma," Verhoeff Society Meeting, Washington, D.C.; "The Pathology of Primary and Secondary Open Angle Glau-



coma," Annual Eye Teaching Day, Edward J. Meyer Memorial Hospital, State University of New York at Buffalo; "Adnexal Carcinoma of Eyelid," Eastern Ophthalmic Pathology Meeting, Montreal, P.Q.

DR. Y. MATUK, "Properties of a Protein Synthesizing Cell-free System Obtained from Beef Corneal Epithelium," Canadian Federation of Biologists Society, Kingston.

DR. M. ARSTIKAITIS, "Ophthalmic Problems of the New Born," A Meeting of the Medical Staff, Hospital for Sick Children.

DR. L. A. LLOYD, "Electro-nystagmography," Canadian Ophthalmological Society meeting, Ottawa.

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BASU, P. K. "Basic Research in the Problems of Old Age" (*Pakistan Journal of Geriatrics*, Jan. 1967, pp. 4-5).

——— "Experimental Studies on Corneal Graft Reaction" (*Indian Journal of Ocular Pathology*, vol. 1, no. 1, Dec. 1967, pp. 32-9).

——— "Opening of New Research Laboratories" (*Canadian Journal of Ophthalmology*, vol. 2, no. 4, Oct. 1967, pp. 303-6).

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CRAIG, B. J., and MACDONALD, R. K. "The Effect of Tonography on the Paired Weight Measurement of Ocular Rigidity" (*Canadian Journal of Ophthalmology*, vol. 2, no. 3, July 1967, pp. 185-9).

CRAWFORD, J. S. "The Timing of Surgery in Strabismus" (*Bulletin of the Hospital for Sick Children*, vol. 17, second quarter, 1967, pp. 5-6).

Feldman, F. and HILL, J. C. "Tissue Barrier Modifications of a Wheeler II Operation for Entropion" (*Archives of Ophthalmology*, vol. 78, no. 5, Nov. 1967, pp. 621-3).

HAUSLER, H. R. "Diabetic Retinopathy: Newer Concepts of its Pathology and Treatment" (*International Ophthalmology Clinics*, vol. 7, no. 1, spring 1967, pp. 39-56).

HILL, J. C. "Recent Advances in Ophthalmic Plastic Surgery" (*International Ophthalmology Clinics*, vol. 7, no. 1, spring 1967, pp. 135-55).

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MACDONALD, D'ARCY. "Aids for the Partially Sighted" (*International Ophthalmology Clinics*, vol. 7, no. 1, spring 1967, pp. 217-30).

MACRAE, H. M., and NEWBIGIN, B. "Von Hippel-Lindau Disease: A Family History" (*Canadian Journal of Ophthalmology*, vol. 3, no. 1, Jan. 1968, pp. 28-34).

McCULLOCH, C. "Surgery of Filtering Blebs" (*International Ophthalmology Clinics*, vol. 7, no. 1, spring 1967, pp. 125-34).

PASHBY, T. J., and MACDONALD, R. K. "Medical Control of Steroid-Induced Glaucoma" (*Canadian Journal of Ophthalmology*, vol. 2, no. 3, July 1967, pp. 181-4).

RAFUSE, E. V., ARSTIKAITIS, M., and BRENT, H. P. "Ocular Findings in Thalidomide Children" (*Canadian Journal of Ophthalmology*, vol. 2, no. 3, July 1967, pp. 222-5).

SHEA, M. "Complications of Cryotherapy in Retinal Detachment Surgery" (*Canadian Journal of Ophthalmology*, vol. 3, no. 1, April 1968, pp. 109-15).

——— "Cryosurgery of Vitreous and Retina" (*International Ophthalmology Clinics*, vol. 7, no. 1, spring 1967, pp. 2-18).

——— "A Microprobe for Intraocular Surgery" (*Canadian Journal of Ophthalmology*, vol. 2, no. 3, July 1967, pp. 163-8).

SMITH, D. R., and SHEA, M. "The Effect of Sub-freezing Temperature on Rabbit Corneal Epithelium" (*Canadian Journal of Ophthalmology*, vol. 2, no. 3, July 1967, pp. 153-7).

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SPEAKMAN, J. S. (with LEESON, T. J.) "The Pathogenesis of Chronic Simple Glaucoma" (*International Ophthalmology Clinics*, vol. 7, no. 1, spring 1967, pp. 85-101).

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## OTOLARYNGOLOGY

*Under the direction of Professor D. P. Bryce*

The Department of Otolaryngology has continued during the past year the rapid expansion in all its activities; and in particular, in the field of research under the direction of Dr. Walter Johnson.

The rapid expansion in the clinical services and clinical research fields, particularly with regard to otology and the various facilities for ambulatory care, has led to a very marked shortage of Departmental space in most of the teaching hospitals. Plans have been formulated at the Toronto General Hospital, Toronto Western Hospital, St. Michael's Hospital and Mount Sinai Hospital for the construction of new and expanded facilities which are rapidly becoming essential if the Department is to carry out its function in the field of undergraduate and postgraduate education and clinical and basic research.

Dr. Barber and the members of his committee for undergraduate education in the Department have worked with the period committee during the year and have obtained satisfactory agreement as to the role of the Department in the new teaching curriculum. In the meantime, a written examination in otolaryngology held at the end of each quadrimester has been inaugurated and the committee is pleased with the results and feel that this is a step forward in the presentation of material to undergraduates.

The postgraduate training programme for residents has been again expanded so that there are now 31 enrolled in this course including a Chief Residency at the Toronto General Hospital. Expansion of the resident programme to allow for residents to take part in research projects has been carried out during the past year. Residents involved in these research projects have been sent to courses throughout the United States during the year and attended meetings when their subject matter is being presented. It is felt that this is a most important part of the programme and not only results in an improvement of research information but acts as a stimulus to develop interest in academic careers. Dr. W. S. Goodman has prepared and has had printed a comprehensive outline of the Postgraduate Course in Otolaryngology and this will be circulated to all those interested in the field of postgraduate education, and also to candidates who may desire to enrol in our course. The result of all these activities has been a much more academically orientated residency training programme and also a marked increase in the number of applications received by the Department.

Until such time as space is available in the Banting Institute, facilities for research within the Department have extended to space in the church at 92 College Street and space has been made available to Dr. John Fredrickson in the Medical Sciences Complex.

During the course of the year the Cortical Audiometric Unit at the Toronto General Hospital has been opened and is functioning fully, particularly in giving service to severely deaf children from all parts of the province. Additional audiometric and research personnel have been taken into the Department to assist in the running of this particular project.

During the course of the year, the Department sponsored a refresher course for specialists in otolaryngology, at which the guest speakers were Professor John Bordley of Johns Hopkins University and Professor George Reed from State University of New York. The following month, as an innovation, a course for audiologists and otologists sponsored by the Department was presented and this attracted almost one hundred applicants from all parts of Canada.

Professor I. Friedmann of the Institute of Laryngology and Otology in London, England, visited the Department in June immediately preceding the Canadian Otolaryngological meeting and was a guest speaker at a course in ear, nose and throat pathology sponsored by the Departments of Otolaryngology and Pathology and the



Division of Postgraduate Medical Education to which candidates came from many parts of Canada and the United States. Immediately afterwards, Professor Friedmann presented a short course in pathology for residents.

The Departmental weekly conferences during the year have been a tremendous assistance in the training of residents and proceedings of these programmes are being prepared for distribution to interested parties. The Department is very appreciative of the assistance it has received from other University departments and personnel. In particular, the Departments of Pathology, Physiology and Anatomy have been more than helpful in their assistance with our training programme.

## RESEARCH

Considerable expansion of research activity in Otolaryngology has been possible due to a number of factors; namely, increase in the number of interested personnel, additional laboratory space and a marked increase in financial support from government, industry and private sources. Although the Department does not grant graduate degrees in this specialty, it is expected that this will be the case in the near future. Meanwhile, because of arrangements with the Department of Physiology, several graduate students are in the process of qualifying for advanced degrees involving fundamental physiologic research in hearing and balance.

The various projects which have been active during the past year are as follows:

### *Cortical Evoked Potentials*

An intensive investigation is under way in order to utilize a refined type of electroencephalography which measures hearing in newborns, children and adults. The research involved concerns the development of appropriate electronic procedures together with a determination of those factors which influence the effectiveness of this special audiometric procedure. This development was largely possible because of a generous grant from the Carey Fox family of Toronto, together with considerable assistance from the Medical Research Council which provided funds to enable Dr. K. Taguchi of Tokyo to provide valuable assistance as a Visiting Scientist and also enabled the acquisition of Dr. T. Picton as a Research Associate. A graduate student, Dr. John Orpin, supported by the Defence Research Board, supervised the biomedical electronics involved. Additional financial support was donated by the Canadian Life Insurance Association and the Defence Research Board. The research, which was directly supervised by Dr. Wilfred Goodman, established two complete units in the Toronto General Hospital; one for the testing of deafness in new borns, the other for neurological disorders (including malingering in adults).

### *The Autonomic Effect of Severe Vestibular Stimulation*

This research is carried out in co-operation with the Department of Physiology and the Toronto General Hospital. It involves the use of human subjects, and concerns a determination and measurement of various body functions connected with the vestibular system. This research is directly supervised by Dr. W. H. Johnson with active participator Dr. John Orpin (graduate student in physiology), and supported by a grant from the Defence Research Board. Progress during the past year has been concerned with the development of special infra-red recording of eye movement including pupil changes as an index of autonomic responses. Due to application of this research to the medical problems of space travel, the investigators have been invited by the National Aeronautics and Space Administrators to become associated with the astronaut programme (Bio-Astronautics).

### *Efferent Pathways from the Central Nervous System to the Organ of Hearing*

This research involves animal experimentation, and the insertion of micro-electrodes into the appropriate tracts of the central nervous system. This investigation is also concerned with the effects of ototoxic drugs on both the organs of hearing and of



balance. Dr. V. Dayal has initiated this research with laboratory assistance from the Defence Research Establishment at Downsview, Ontario, pending the obtaining of appropriate space at the University. Other hearing research concerns tone decay at different sensation levels using the Bekesy Audiometer studying the incidence of sensori-neural hearing loss in the general population.

#### *Nystagmus and its Significance*

This research involves human experimentation at the Toronto General Hospital, with studies being made on both normal and pathologic cases. Laboratory procedures are being developed to determine different methods for inducing various types of nystagmus, in an attempt to determine their significance in clinical cases. Various anti-vertigo and anti-nauseant drugs are also being investigated; this involves the development of new objective indices, of nausea with the co-operation of the Institute of Bio-Medical Electronics at the University (Dr. E. L. Thomas). Support for these projects comes from the Hartford Foundation of New York and is conducted by Drs. Barber, Johnson and Farkashidy.

#### *Cervical Lymph Node Surgery*

Comparative studies were made of radical neck dissection techniques with the help of lymphangiograms using animal surgery. The project was carried out by Dr. V. Dayal with financial support from the Sunnybrook Hospital, University of Toronto Clinic.

#### *Electronmicroscopy*

This involves animal experimentation in an attempt to determine the origin and circulation of the various fluids of the organ of balance, this also being applicable to the aetiology of such disorders as Meniere's Disease. The facilities of the Department of Pathology in the Banting Institute are utilized in this project as are those of the Defence Research Establishment in Downsview. Dr. G. Dohlman has received support from the Medical Research Council for this project; in recognition of his contributions to vestibular physiology has been awarded the Barany Medal in Sweden.

#### *Nasal Function*

An accurate procedure for the measurement of nasal air flow has been developed by one of the Residents in training (Dr. M. Morrison) together with the assistance of a summer student (Mr. Philip Fingrut). The Departments of Otolaryngology at Sunnybrook Hospital and the Toronto General were used and the technique is applicable to an evaluation of the effectiveness of nasal decongestants as well as determining the patency of the nasal airways of patients referred for surgery.

#### *Functions of the Otolith Organs*

Drs. B. Smith and W. H. Johnson have been carrying out experimental animal surgery with the objective of differentiating the specific functions of the various parts of the organ of balance. Progress has been concerned with the technical difficulties of the microsurgery involved.

#### *Assessment of Vestibular Sensitivity*

With the help of the Metex Corporation of Toronto, Dr. W. H. Johnson has developed a new type of electronic computer which presents a rapid analogue and digital presentation of sensitivity of the organ of balance. This, and the above project, have been largely supported by a grant to St. Michael's Hospital from the Atkinson Foundation of Toronto.

#### *Neck Injury and Vertigo*

Experimental animal surgery is being carried out in the Banting Institute in attempts to determine the role of certain activities in the neck (cervical afferents) on the



vestibular nuclei in the brain stem. This work is applicable to an understanding of the aetiology of neck injury. This study is supported by the Medical Research Council and involves Drs. H. Barber, W. Johnson and J. McClure, the latter a graduate student in the Department of Physiology.

#### *Diseases and Injury of the Larynx*

This research is being conducted by Professor D. P. Bryce at the Toronto General Hospital and is supported by grants from the Charlie Conacher Research Fund and the Ontario Cancer Foundation.

#### *Temporal Bone Histo-Pathology*

Through the assistance of the Dean's Special Fund and the Department of Pathology, a well-equipped and efficient laboratory has been established. Techniques being used are the result of consultation with other outstanding laboratories in the U.S.A. (Boston Eye and Ear Infirmary of Harvard University, Baylor University, University of Chicago, Billings Hospital, etc.). This facility is being expanded to enable study of other tissues of interest to the otolaryngologist.

#### HONOURS

DR. H. O. BARBER, elected member of the American Otological Society and the Barany Society of Sweden.

DR. P. E. IRELAND, Canadian Centennial Medal on recommendation of the Canadian Otolaryngological Society.

DR. GOSTA DOHLMAN, Barany Medal, presented by the Barany Society, Upsala, Sweden.

DR. K. McASKILE, President, Canadian Otolaryngological Society.

#### SCHOLARLY ADDRESSES

DR. H. O. BARBER, "Postural Vertigo and Positional Nystagmus," American Academy of Ophthalmology and Otolaryngology.

DR. R. D. BELL, "Hearing Conservation in Industry," Ontario Speech and Hearing Association.

DR. D. P. BRYCE, "Laryngotracheal Injury," Second British Academic Conference in Otolaryngology, Oxford, England; "Increasing Problems of Laryngotracheal Injury," Cleveland Otolaryngological Society; "Nasopharyngeal Fibroma and Glomus Tumours," Denver, Colorado.

DR. T. D. R. BRIANT, "Hypophysectomy," Ontario Association of Speech and Audiology; "Augmentation of the Vocal Cords," Ontario Medical Association.

DR. J. FARKASHIDY, "Head Injury and Dizziness," Ontario Medical Association.

DR. W. S. GOODMAN, "Sinusitis," Scarborough Medical Society; "Frey's Syndrome," Toronto General Hospital.

DR. W. H. JOHNSON, "Medical Problems of Space Flight," Canadian Manufacturers' Association; "Orientation in Space," Carleton University, Summer Science Programme.

DR. D. A. HALDENBY, "Malignant Tumours of the Middle Ear," Toronto Western Hospital Clinical Research Meeting.

#### PUBLICATIONS

BARBER, H. O., BASSER, W., JOHNSON, W. H., and TAKAHASHI, P. "Laboratory Assessment of Anti-motion Sickness and Anti-vertigo Drugs" (*Canadian Medical Association Journal*, vol. 97, Dec. 9, 1967, pp. 1460-6).

BARBER, H. O., and WRIGHT, G. W. "Release of Nystagmus Suppression in Clinical Electronystagmography" (*Laryngoscope*, vol. 77, no. 6, June 1967, pp. 1016-27).

BRIANT, T. D. R. "Hypophysectomy" (*Laryngoscope*, vol. 77, no. 4, April 1968, pp. 649-50).



- BRIANT, T. D. R., and SNELL, D. "Diagnosis of Cerebral Spinal Rhinorrhea and the Rhinologic Approach to its Repair" (*Laryngoscope*, vol. 77, no. 8, Aug. 1967, pp. 1390-1409).
- BROSNAN, M. L. "Primary Cholesteatomas of the Temporal Bone" (*Archives of Otolaryngology*, vol. 86, no. 4, Oct. 1967, p. 363).
- BRYCE, D. P., and DAYAL, V. S. "Surgical Management of Carcinoma of the Larynx" (*Applied Therapeutics*, vol. 10, no. 3, March 1968, pp. 179-82).
- BRYCE, D. P., and LAWSON, V. G. "Trough Method of Laryngotracheal Reconstruction" (*Annals of Otology, Rhinology and Laryngology*, vol. 76, no. 4, Oct. 1967, pp. 793-803).
- JOHNSON, W. H., SMITH, J. B., and SULLIVAN, J. "Assessment of Vestibular Sensitivity" (*Annals of Otology, Rhinology and Laryngology*, vol. 76, no. 3, Aug. 1967, pp. 709-15).
- NITO, Y., JOHNSON, W. H., and IRELAND, P. E. "Positional Alcohol Nystagmus in the Cat" (*Annals of Otology, Rhinology and Laryngology*, vol. 77, no. 1, Feb. 1968, pp. 111-25).
- NOYEK, A. M. "Cysts and Benign Tumours of the Sinuses"; in *Textbook on Seminars in Radiology, Symposium on Parnoid Sinuses*, ed. Benjamin Felson, pp. 170-202. New York: Stratten, 1968.
- SMITH, J. K. B. "Facial Palsy and its Management" (*Ontario Medical Review*, vol. 35, no. 4, April 1968, pp. 197-8).

## PAEDIATRICS

*Under the direction of Professor H. W. Bain*

Several significant events occurred during the past year. Dr. John Darte, Chief of the Division of Haematology at The Hospital for Sick Children, has been chosen Professor of Paediatrics at Memorial University, Newfoundland. Dr. P. D. McClure has been named Chief of the Division of Haematology.

Dr. J. H. Ebbs, who is now Director of the School of Physical and Health Education, University of Toronto, remains as consultant to the Division of Postgraduate Education, The Hospital for Sick Children.

Dr. Charles Snelling became Chief of the Department of Paediatrics of the new North York General Hospital.

Dr. John Wilson left to become Head of the Department of Paediatrics in the new Scarborough Centenary Hospital.

Psychiatry, previously attached to Paediatrics, became a separate department within The Hospital for Sick Children with Professor William Hawke as its Head. Dr. Hawke retires as of the 30th of September, 1968, as Head of the Department of Child Psychiatry. He will be replaced by Dr. Quentin Rae-Grant. Dr. Hawke will remain in the Department of Paediatrics of the University of Toronto and of The Hospital for Sick Children as Director of a new Division of Growth and Development.

The Hospital for Sick Children is the first university affiliated hospital in Canada to establish a Department of Medical Communications with the appointment of a full-time editor (Dr. Helen Evans Reid), a secretary (Miss Janet Walton) and Consultant Editor (part-time) Dr. John Godden.

The Department is organized to give technical and editorial assistance to all members of the hospital staff who submit articles for publication in the scientific press. Members of the staff of this new Department gave a course in scientific writing to residents and fellows of the Hospital for Sick Children. They also presented an undergraduate course at the University of Western Ontario and a postgraduate course at the University of Ottawa. Instruction of residents in the writing of histories and final notes as part of their introduction to the hospital is given by this Department.

During the first year of operation over 100 papers were processed by this Department and subsequently published in various medical and technical scientific journals.

A Division of Medical Education was established with Dr. James Boone as its Head.

In September of 1968, Dr. Quentin Rae-Grant will become Head of the Department of Child Psychiatry.



Virology was established as a separate department within the Hospital with Dr. Peter J. Middleton from New Zealand as Head. Professor G. Fanconi and Professor A. Fanconi from Zurich, Switzerland, and Professor Minkowski from Paris, France, were Visiting Professors to the Department of Paediatrics.

Dr. Donald Fraser left in December 1967 to spend a sabbatical year in Berne, Switzerland. Dr. Robert Ehrlich, Dr. Fred Saunders and Dr. Sang Whay Kooh joined the full-time staff of The Hospital for Sick Children.

A new residency programme in Dermatology was begun. A Department of Behavioural Science was formed within the Faculty of Medicine with Dr. Robin Badgley as its Head. This department has been attached to the Department of Paediatrics.

A Clinic for Developmental Assessment of Children was established by Dr. K. Haka. Dr. Howard Savage, who has served in the Allergy Division for over 25 years, retires at the end of this academic year to join the Department of Anthropology at the University of Toronto and the staff of the Royal Ontario Museum.

The Department of Paediatrics continued its programme of teaching assistance to the University of the West Indies in Jamaica.

The following visited the Department of Paediatrics during 1967–1968: Dr. David G. Nathan, Boston, Mass.; Dr. Barbara Ansell, Taplow, England; Dr. Frederic N. Silverman, Cincinnati, Ohio; Professor Ettore Rossi, Bern, Switzerland; Professor Otto Wolfe, London, England; Dr. Colin Forbes, Lagos, Nigeria; Dr. O. Ransome-Kuti, Lagos, Nigeria; Dr. R. Hendrickse, Ibadan, Nigeria; Dr. Tom Stapleton, Sydney, Australia; Dr. Jose Ramirez, Baltimore, Maryland; Dr. Alf Backman, Helsinki, Finland; Dr. Divak Pongpipat, Bangkok, Thailand; Dr. Espino-Vela, Mexico; Dr. Elizabeth Wilmot, Melbourne, Australia; Dr. Robert Southby, Melbourne, Australia; Dr. N. Hale, Cambridge University, England; Dr. Alice Bush, Auckland, New Zealand; Dr. V. L. Collins, Melbourne, Australia; Dr. A. Nisonoff, Chicago, Illinois; Professor M. Verstraete, Leuven, Belgium; Dr. Murray Davidson, New York City, N.Y.; Dr. Hung, University of Taipei.

RESEARCH

Adolescent Clinic

The Hospital for Sick Children’s “Teen Clinic” has been in continuous operation since October 5, 1966.

I SERVICE. An analysis of the service rendered by this clinic is shown in Table I.

TABLE I

	1st 6-month period Oct. 5, 1966 to Apr. 30, 1967	*2nd 6-month period Apr. 30, 1967 to Oct. 30, 1967	3rd 6-month period Nov. 1, 1967 to Apr. 30, 1968
No. of clinics held	29	16	25
Total new patients	34	25	57
boys	13	10	13
girls	21	15	44
Total no. of visits	101	90	172
Total no. of group visits (obesity)	1	6	14
Average per group	6	5	5

\*The clinic was closed from July 15 to September 1, 1967.

It can be seen that there has been a 60 percent increase in new patients and in the number of visits for the corresponding first and third 6-month periods. The age distribution of patients was 11 years, 1; 12 years, 3; 13 years, 13; 14 years, 20; 15 years, 17; 16 years, 19; 17 years, 6; and 18 years, 3. The mean age was 15.4 years.



*Allergy*

Dr. Collins-Williams and Dr. Moscarello began a study of experimental asthma in guinea pigs and also a study on the absence of Gamma globulin IgA in the human.

*Cardiology*

Dr. John Keith, with Dr. Li, Dr. George Collins, Dr. Hallidie-Smith and Dr. Vera Rose, continued his research into the natural history of congenital heart disease. With Dr. George Collins he began a large programme to make the clinical, radiographic, electrocardiographic, haemodynamic, surgical and autopsy data on some 15,000 children with congenital heart disease available to computer analysis. Dr. B. S. L. Kidd continued his studies in haemodynamics both in patients with congenital heart disease and in experimental animals. In the various aspects of this work, he was assisted by Dr. Fukuda, Dr. M. Colombi, Dr. Shaher, Dr. P. Olley, Dr. George Trusler, Dr. George Collins and Dr. Shyama Virmani. Dr. R. S. Fowler continued his studies of the electrocardiogram and vectorcardiogram in a variety of congenital heart diseases. With Mr. O'Beirne, he has studied the application of computer techniques to the analysis of electrocardiograms. Dr. Vera Rose continued her studies on the incidence and prevalence of congenital heart disease in the community and her long term follow-up studies on children with ventricular septal defect.

*Disease Classification*

Diseases "Peculiar" to Adolescence were: obesity (23), menstrual disorders (8), acne (5), school adjustment (4), pubertal delay (1), gynaecological (4), suspected pregnancy (2). The total was 47. Seventeen patients had primary emotional disturbances. Four patients had emotional disturbances secondary to a disease state. General problems were: visual defects (8), dermatological (4), headache (4), E.N.T (3), orthopaedic (3), G.I. (3), G.U. (2), neuromuscular (2), mental retardation (2), ulcerative colitis (1), diabetes mellitus (1), rheumatic fever (1), speech problem (1), chest (1), plastic (1), miscellaneous (2). The total was 39. It is of interest to note that although two patients were seen for suspected pregnancy, no cases of pregnancy were diagnosed through this clinic. No cases of venereal disease were seen.

II TEACHING PROGRAMME. The Teen Clinic teaching programme has been enlarged to include weekly rounds and to involve residents, student nurses and other hospital staff. Rounds are held weekly at the completion of the clinic. Cases seen are presented by the staff and are discussed. Rounds are attended by all those at the clinic including residents, physicians, a psychiatrist, nurses, a public health nurse and a social worker. This ensures a multidisciplinary approach to patient management. These rounds are usually visited by interested residents and student nurses. All cases seen by the residents are reviewed by the attending staff so that the patient may also be a learning experience for the interne staff. Two student nurses are regularly assigned to this clinic and attend the rounds. It is hoped that this has been a learning experience for them. A more formal teaching programme involving our nurse-in-charge, Miss H. Dutfield, is planned for next season. Other teaching includes lectures to the intermediate and senior classes of the School of Nursing, to the Nurses In-Service teaching, to the Nursing Assistants and to the Recreation Department. A lecture to the dietetic department is scheduled for July 1968.

III RESEARCH. Two research projects have been planned and one is being completed presently. Group Therapy for Adolescent Obesity was started in March 1967 and a critical analysis is now in progress. A paper of the above title was submitted to the Canadian Paediatric Society for presentation but was not accepted. It is planned to submit this for publication elsewhere.

A protocol of study on "Plasma Insulin, Growth Hormone and Fatty Acid Levels in Obese Adolescents" has been submitted to Dr. John Bailey and has been accepted. Work will commence after July 1, 1968.

Research projects involving the Adolescent Clinic will be presented to the



incoming resident staff. It is hoped that some adolescent research projects will be picked up.

The hospital's Medical Social Service department has been approached with regard to the availability of our clinical material for a research project through the University of Toronto, School of Social Work.

Dr. George Collins continued his prospective study of children with ventricular septal defect with special reference to complications and natural history. With Dr. Shepley he has made this data available to computer analysis.

### *Chest*

Dr. J. A. Turner with Dr. P. C. Fleming of Bacteriology carried out a study of the role of mycoplasma pneumoniae in respiratory diseases of children. Dr. Henry Levison has continued his studies of pulmonary physiology in patients with asthma, cystic fibrosis, scoliosis (with Dr. John Hall of the Orthopaedic Service) and in collaboration with Dr. Norman Aspin carried out studies with radioactive Xenon 133 of regional perfusion and ventilation of the lung. Dr. Douglas Crozier of the Clinic for Cystic Fibrosis continued his studies of the natural history of this disease and the assessment of various therapeutic regimens.

### *Endocrinology*

Dr. J. D. Bailey and his group have continued their studies of growth hormone and problems of growth failure. Dr. Robert Ehrlich is investigating three areas in close collaboration with Dr. J. Martin: (1) the effect of drugs on hypoglycemia; (2) the mechanisms of ketotic hypoglycemia; (3) hypoglycemia and erythroblastosis fetalis.

### *Gastroenterology*

Dr. J. R. Hamilton continues his studies of intestinal malabsorption, having established two models of the malabsorptive state in the rat. Quantitative measurements of intestinal function are being applied to the models and new techniques are being developed to both define the abnormalities and to delineate the mechanisms lying behind them. Clinical disorders of the gastro-intestinal tract are being documented in children and a start has been made to apply observations and techniques from animal studies to children.

### *Genetics*

Dr. Margaret Thompson continued several research programmes. With Dr. Q. H. Qazi on the genetics of the adrenogenital syndrome using gas chromatographic techniques to assay steroid fractions in 24-hour urine samples from heterozygotes and controls; with Mrs. Elaine Hutton a study of the carriers of Duchenne muscular dystrophy; with Miss Jane Prosser a study of intelligence in patients with Duchenne muscular dystrophy and their families was completed. Dr. Thompson is also carrying out a discriminant analysis by computer of the dermatoglyphics of children with various chromosomal syndromes as compared with controls and is collaborating with Dr. Sass-Kortsak and Dr. Hercz in a study of galactosemia.

### *Haematology*

Dr. John Darte and Dr. Marilyn Sonley are continuing their co-operative studies of chemotherapeutic agents in the treatment of malignancy in childhood. Dr. Darte is also continuing his studies of the white cell enzymes in malignant disease and leukemia in childhood. Dr. Peter McClure completed his studies of thrombopoietin and erythropoietin levels in patients with idiopathic thrombocytopenic purpura. An investigation into the cause of bleeding in newborn infants with respiratory distress syndrome is currently in progress. This involves investigation of the coagulation system and fibrinolytic systems. A survey of patients with bleeding disorders was conducted in three eastern Ontario counties as a pilot project prior to doing a large scale survey



in Ontario. Another study in progress is his search for low titre inhibitor substances in patients with hemophilia which might account for the rather poor results of replacement therapy in such patients.

#### *Infectious Service*

The study of the effect of various antibiotics on purulent meningitis has continued. Dr. Richard Hamilton and Dr. Robert Sutton carried out a study on the effect of monosaccharide or disaccharide feedings in infants with gastro-enteritis.

#### *Metabology*

Dr. Donald Fraser and Dr. S. W. Kooh prepared the following projects: (1) Radio-immuno assay and immunological studies of parathyroidism hormone; (2) Magnesium metabolism in experimental animals; (3) Calcium Kinetics; (4) Clinical investigations of various metabolic bone diseases in children. Dr. I. M. Radde is carrying out studies of the action of calcitonin on bone from rachitic and osteoporotic animals and magnesium-calcium interrelations in animals. The temporary hypocalcemia and hypomagnesemia occurring in the neonatal period is being studied in collaboration with Dr. Swyer. The effect of prolonged magnesium depletion on calcium and magnesium kinetics is being studied in rats.

Dr. Sass-Kortsak in collaboration with Dr. S. H. Jackson of the Biochemistry Research Division and Dr. Margaret Thompson of the Division of Genetics is studying clinical, biochemical and genetic aspects of inborn errors of amino acid metabolism. Dr. Sass-Kortsak in collaboration with Drs. Aspin, Sarkar and Mrs. Cox continued his studies on copper metabolism and Wilson's disease. Dr. W. B. Hanley is conducting clinical research on phenylketonuria.

#### *Neonatology*

Under the direction of Dr. Paul Swyer and in collaboration with Dr. J. D. Owen-Thomas, Dr. Orest Ulan, Dr. Lydia Linsao, Dr. Norman Aspin, Dr. Marilyn Sutton, Dr. Alan Murdock and others, the following projects are being carried out: (1) An investigation into the physiology of assisted ventilation in pulmonary disease of the newborn; (2) An evaluation of various types of assisted ventilation; (3) A comparison of treatment of neonatal acidosis with various therapeutic regimens; (4) The development of a method for the measurement of regional ventilation and blood flow; (5) An investigation into the neonatal adjustments of asphyxiated newborn infants.

#### *Nephrology*

Under the direction of Dr. Phillips-Rance and in collaboration with the Department of Surgery, the programme in renal dialysis has continued as has the programme of the assessment of renal biopsy material in conjunction with Dr. P. Conen.

#### *Neurology*

Under the direction of Dr. J. S. Prichard and with the collaboration of Dr. J. A. Lowden and Dr. E. G. Murphy the following research projects are under way: (1) Study of evoked cerebral potentials in neonates with respiratory distress syndromes and other cerebral pathology; (2) Linguistic abilities in children with hemispherectomies; (3) Anticonvulsant drug studies on epileptics; (4) A multi-disciplinary assessment of children with learning disabilities. Dr. J. A. Lowden of the Division of Biochemistry is primarily engaged in a study of lipids in brain. Dr. E. G. Murphy is interested in muscle and the study of hereditary muscular dystrophies in collaboration with Dr. Conen of the Division of Pathology Research and Dr. Margaret Thompson of Genetics. Dr. J. B. J. McKendry has continued a study of untreated patients with enuresis in collaboration with Dr. H. Williams.



*Psychiatry*

Drs. Havelkova and Greenbaum and Dr. William Hawke have almost completed their project on the effect of Niacin therapy in autistic children. Dr. Hawke initiated a project in Kingston, Jamaica, assessing intellectual function in Jamaican children.

## HONOURS

DR. J. D. BAILEY, Member of the American Paediatric Society.

DR. M. BRANDO, Appointed Chairman, Section of Paediatrics, Ontario Medical Association.

DR. J. M. M. DARTE, Dominion of Canada Centennial Medal.

DR. J. D. KEITH, First John D. Keith Lecture, Canadian Cardiovascular Society, F.R.C.P.C.

DR. B. S. L. KIDD, F.R.C.P.E.

DR. J. B. J. MCKENDRY, Appointed Chairman of Ontario Chapter of the American Academy of Paediatrics.

DR. J. S. PRICHARD, President of the Eastern E.E.G. Society; Vice-President of the Canadian Neurological Society; Councillor of the American Epilepsy Society; Dominion of Canada Centennial Medal.

DR. J. A. P. TURNER, Elected Chairman of the Section on Diseases of the Chest, American Academy of Pediatrics.

## SCHOLARLY ADDRESSES

C. S. ANGLIN, "Management of Purulent Meningitis in Children," Canadian Paediatric Society, Toronto.

N. ASPIN, H. LEVISON, T. R. WENG, E. A. FEATHERBY, A. C. BRYAN, "Measurements of Regional Ventilation and Blood Flow in the Lung Using  $^{133}\text{Xe}$  and a Scintillation Camera," Society of Nuclear Medicine, St. Louis, Mo.; "The Distribution of Blood Flow in the Human Lung," Canadian Association of Physicists, Calgary, Alberta.

C. COLLINS-WILLIAMS, Canadian Paediatric Society, Toronto; American Academy of Pediatrics, Washington, D. C.; Ontario Medical Association, Toronto; Canadian Paediatric Society, Saskatoon; American College of Allergists, Kansas City.

J. M. M. DARTE, "Wilm's Tumour and Neuroblastoma," Janeway Child Health Centre.

R. S. FOWLER, "Use of the Digital Computer in Electrocardiographic Studies," Canadian Cardiovascular Society, Montreal.

J. R. HAMILTON, "Experimental Production of Abnormalities of Function and Structure in the Small Intestine," Canadian Paediatric Society, Toronto, September 1967.

J. R. HAMILTON, I. C. RADDE, G. E. JOHNSON, "Diarrhea Associated with Functioning Ganglioneuroma," Canadian Society of Clinical Investigation, Toronto.

——— "Intolerance to Dietary Gluten in the Rat Produced by the Constant Infusion of Dilute Lactic Acid into the Intestinal Lumen," Federation of American Societies for Experimental Biology, Atlantic City.

——— "Infusion of Lactic Acid into the Intestinal Lumen," "An Experimental Model of Gluten Intolerance," 8th International Congress of Gastroenterology, Prague, Czechoslovakia.

W. B. HANLEY, L. LINSAO, W. DAVIDSON, C. A. F. MOES, "Malnutrition Caused by Dietary Treatment of Phenylketonuria," American Society for Paediatric Research, Atlantic City.

W. HANLEY, "Metabolic Screening of the Newborn," Academy of Medicine, Toronto.

J. D. KEITH, "Natural History of Congenital Heart Disease," Inter-American Congress of Cardiology, Lima, Peru; Winston-Salem & Duke University, Richmond, Va.



B. S. L. KIDD, "Haemodynamic Effects of Propranolol and Isoproterenol in the Anaesthetised Dog," Canadian Federation of Biological Societies, Montreal, P.Q.; "Shunt Timing and Congenital Heart Disease with a Fibreoptic Cardiac Catheter," Canadian Cardiovascular Society, Montreal, P.Q.; "The Hemodynamic Spectrum of Congenital Left-to-Right Shunts in Childhood," Royal College of Physicians and Surgeons of Canada, Toronto. "The Role of Adrenergic Receptors in Hypoxia-induced Pulmonary Vasoconstriction," Canadian Federation of Biological Societies, Kingston; Workshop in Cardiology, University of Alberta.

H. LEVISON, "Pulmonary Function in Scoliosis," The Dewar Orthopaedic Club, Toronto.

H. LEVISON, T. R. WENG, E. A. FEATHERBY, D. CROZIER, "Measurements of Pulmonary Diffusing Capacity in Normal Children and in Patients with Cystic Fibrosis," The Society for Paediatric Research, Atlantic City.

P. D. McCLURE, "The Hemophiliac and his Genes," Kitchener Auxiliary of the Ontario Chapter, Canadian Hemophilia Society; "Hemophilia - The Future," Ontario Chapter of the Canadian Hemophilia Society; "Haemorrhage in Newborn Infants with Respiratory Distress Syndrome," Canadian Paediatric Society, Saskatoon.

M. A. MOSCARELLO, J. A. LOWDEN, D. D. WOOD, "Polypeptides in Cerebral Myelin from Normal Humans and Patients Dying with Multiple Sclerosis," American Academy of Neurology, Chicago.

E. G. MURPHY, "Manifestations of Duchenne Muscular Dystrophy in Carriers," International Congress of Neuro-genetics, Montreal.

J. B. OWEN-THOMAS, R. S. JONES, O. ULAN, P. SWYER, "Gas Exchange in a Lung Analogue and in Infants in Response to Varying Patterns of Intermittent Positive Pressure Ventilation," Canadian Federation of Biological Societies, Section on Physiology, July, 1967.

J. B. OWEN-THOMAS, F. C. D. WILKES, A. W. CONN, P. R. SWYER, "A Clinical Respirometer for Neonates," American Pediatric Society (Programmes and Abstracts), 1967, p. 54.

I. C. RADDE, E. R. WITTERMAN, S. PENSUWAN, "Effect of Parathyroid and Thyroid on Hypocalcemia Occurring after a Magnesium Load," 3rd Parathyroid Conference, Quebec, October, 1967.

E. F. SAUNDERS, "Re-entry of Non-dividing Leukemic Cells into a Proliferative Phase," American Society for Clinical Investigation, Atlantic City.

P. R. SWYER, "Prevention of the Respiratory Distress Syndrome," Kingston Academy of Medicine Clinic Day, Kingston; "Continuity of Care of High Risk Infants," National Conference on Maternal and Child Health, Toronto.

M. D. THOMPSON, "Genetic Counselling in Duchenne Muscular Dystrophy," Department of Paediatrics, University Hospital, Saskatoon; "Man and his Genes," Royal Canadian Institute, Toronto; "Genetic Anemias in Mice," Department of Biology, Queen's University, Kingston.

J. A. P. TURNER, "The Bacteriological Significance of the Positive Tuberculin Test in Childhood," Canadian Thoracic Society, Vancouver, B.C.

T. R. WENG, H. LEVISON, E. A. FEATHERBY, "Time Factor in the Measurement of Response to Bronchodilator," Canadian Paediatric Society, Saskatoon.

T. R. WENG, H. LEVISON, "Pulmonary Function in Asthmatic Children from Acute Attack to Symptom-free Status," American Thoracic Society, Houston, Texas.

#### PUBLICATIONS

BAIN, H. W., and EHRLICH, R. M. "Hyperosmolar Non-ketotic Coma" (*The Lancet*, vol. 2, no. 7528, Dec. 9, 1967, p. 1258).

CHOI, S. I., and McCLURE, P. D. "Idiopathic Thrombocytopenic Purpura in Childhood" (*Canadian Medical Association Journal*, vol. 97, no. 10, Sept. 9, 1967, pp. 562-8).

COLLINS-WILLIAMS, C. "The Allergist and the Future of Allergy" (editorial, *Annals of Allergy*, vol. 26, 1968, pp. 44-5).



- *Pediatric Allergy: Notes and Suggested Readings for Medical Students*, 1st ed. Toronto: University of Toronto Press, 1967. Pp. 133.
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- COLLINS-WILLIAMS, C., TOFT, B., GENEROSO, L., and MOSCARELLO, M. "Quantitative Immunoglobulin Levels (IgG, IgA and IgM) in Children Determined by the Hyland Immunoplate Technique" (*Canadian Medical Association Journal*, vol. 96, no. 23, June 10, 1967, pp. 1510-13).
- COLLINS-WILLIAMS, C., TOFT, B., and MOSCARELLO, M. "Serum Protein Studies in Intractable Asthma" (*Journal of Asthma Research*, vol. 4, June 1967, pp. 283-7).
- DARTE, J. M. M. "Hodgkin's Disease in Children" (*American Journal of Roentgenology, Radium Therapy and Nuclear Medicine*, vol. 100, no. 1, 1967, pp. 222-6).
- EHRlich, R. M., and MARTIN, J. "Tolbutamide Tolerance Test and Plasma-Insulin Response in Children with Idiopathic Hypoglycemia" (*Journal of Pediatrics*, vol. 71, no. 4, Oct. 1967, pp. 485-93).
- EHRlich, R. M., MARTIN, J., and BAIN, H. W. "Comment on Management of Hypoglycemia" (editorial, *Journal of Pediatrics*, vol. 71, no. 4, Oct. 1967, pp. 621-2).
- FLEMING, P. C., KRIEGER, E., TURNER, J. A. P., WATTY, E. I., QUINN, P. A., and BANNATYNE, R. M. "Febrile Mucocutaneous Syndrome with Respiratory Involvement Associated with Isolation of Mycoplasma Pneumoniae" (*Canadian Medical Association Journal*, vol. 97, no. 23, Dec. 9, 1967, pp. 1458-9).
- FOWLER, R. S. "Terminal Conduction Delay in Pulmonary Stenosis in Children" (*American Heart Journal*, vol. 21, 1968, pp. 669-72).
- FOWLER, R. S., and KEITH, J. D. "Electrocardiogram in Pulmonary Stenosis - A Reappraisal" (*Canadian Medical Association Journal*, vol. 98, no. 10, March 9, 1968, pp. 433-8).
- FOWLER, R. S., O'BEIRNE, H., EDIBAM, B., and KEITH, J. D. "Use of the Digital Computer in Electrocardiographic Studies" (*Canadian Medical Association Journal*, vol. 98, no. 2, Jan. 13, 1968, pp. 107-8).
- FRASER, D. "The Relation between Infantile Hypercalcemia and Vitamin D - Public Health Implications in North America" (*Pediatrics*, vol. 40, Dec. 1967, pp. 1050-61).
- FRASER, D. (with KOOH, S. W., and SCRIVER, C. R.) "Hyperparathyroidism as the Cause of Hyperaminoaciduria and Phosphaturia in Human Vitamin D Deficiency" (*Pediatric Research*, vol. 1, Nov. 1967, pp. 425-35).
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## PATHOLOGICAL CHEMISTRY

*Under the direction of Professor A. G. Gornall*

A review of progress in the Department during the past year must record both encouraging and discouraging aspects. On the positive side there has been a clarification of the future role and needs of the Department; on the negative side a delay in the provision of facilities that will enable us to get on with the task of meeting our responsibilities. There is now such a measure of agreement among our senior staff, and support from heads of the hospital divisions of clinical biochemistry, that we have complete confidence in our plans for the Department and in the objectives we have set out to achieve. In our approach to the problem of training laboratory scientists in the field of clinical biochemistry we appear to be well in advance of developments in Britain or the United States. There is a good deal of outside interest in our Toronto plans and, given the support they deserve, this Department will certainly be among those that bring special distinction to our Faculty and University.

The need to maintain and expand biochemistry laboratory services in our



Hospitals can be coupled to the training of new generations of clinical biochemists. Both medical and non-medical scientists must be attracted into this professional field, an objective that requires a suitable type of academic and hospital environment. The Department will aim to create a first-class centre of biochemistry in a clinical setting, with approximately equal numbers of basic scientists and medically qualified biochemists on its staff. Each shall understand that career opportunities and academic advancement will depend solely on the contribution being made, in any one or more areas of responsibility, to the work and reputation of the Department. It is only with a capacity to attract first-class basic scientists to the staff of the Department that it will be possible to expect honour science as well as medical graduates to come as graduate students.

A major achievement during the year has been the final completion of detailed recommendations on facilities and staff for the Clinical Biochemistry Divisions of the Department in each of the hospitals of the future Toronto University-Hospitals System. In addition to graduate research facilities, provision has been made for postgraduate and postdoctoral training programmes. During 1967-68 we have established a Diploma Course in Clinical Chemistry, the first of its kind in Canada. This Course is designed to prepare postdoctoral candidates for Certification in Clinical Chemistry and to form a major part of postgraduate training toward the Fellowship in Medical Biochemistry. Five candidates will begin this course in July 1968 and our plans provide for a future enrolment of 36 in the Department. This programme will do a great deal to ensure competence in those responsible for the supervision of hospital laboratory services at the professional level.

Embodied in our proposals for the hospital divisions of the Department is the concept of co-ordinated specialty service laboratories. These are expected to provide, across the university-hospital system, every variety of highly specialized analytical procedure that the clinicians may wish to have carried out. Also available on request will be a clinical research core laboratory service, where the clinical investigator may seek the collaboration of our staff rather than set up a number of procedures independently in his own laboratory. This Department is studying also the merit of centralized fully automated laboratories to handle the bulk of the routine service work from several hospitals. Major policy decisions on some of these questions may be required in the coming year.

On the negative side I feel obliged to record a few discouraging factors. One of these has been the administrative difficulty in acquiring additional space for new staff, and the frustrating delays in obtaining funds for renovations. Another has been the serious limitations this year on budget increments, limiting the acquisition of new staff and aggravating the shortage of funds for new equipment.

The delay in development of an administrative arrangement that will encourage co-operation and confidence in University-Hospital relationships has made it difficult to take action to correct problems that beset several of the hospital service laboratories. It is impossible to discharge effectively a responsibility for the quality of service provided by these laboratories without the authority to work directly with hospital administrations and bring about necessary changes.

Finally I must record our concern for the new curriculum. It is gratifying that so many members of the faculty have become involved in planning the curriculum. Unfortunately their enthusiasm is not always tempered by experience or breadth of vision. In spite of our sincere effort to make helpful recommendations concerning the teaching of clinical biochemistry in Period II, there has been no effective dialogue between the respective Committees and this Department. One would have to conclude, from reading the Committee reports, that our recommendations had been totally ignored. From the standpoint of Pathological Chemistry, the proposed new curriculum appears to be severely deprived of effective instruction in the biochemistry of disease processes, the use of the biochemistry laboratory and the interpretation of data it provides. We earnestly hope that the coming year will see a more co-operative approach to the teaching of this important aspect of patient care.



*Undergraduate Teaching*

The stated aim of the lecture course in Pathological Chemistry is "to provide an understanding of the pathochemistry and pathophysiology of the disease process," and of the laboratory course "to develop a facility in the use of the hospital laboratory service and in the interpretation of the data it provides." A survey of student opinion has indicated that in many respects these aims have been realized. There was, however, enough constructive criticism to provide a basis for revision and improvements in 1968-69. There was a stated desire for more lectures to correlate and update information in this field, and a lack of interest in most laboratory assignments. Seminars, with predominance of student participation, provided the most popular and effective learning experience. This has been due in no small measure to the enthusiasm and ability of our seminar leaders.

Looking ahead to the new curriculum, we have expressed grave doubts about two aspects of the proposals of the systems committees. Because of the virtual absence of dialogue with this Department, we have recommended that a Pathological Chemistry Topic committee be formed to co-ordinate the teaching of the biochemistry of diseases processes in the different systems curricula. Our Department sees great virtue in a balance of responsibility for the curriculum. The present systems committees should, as the faculty-wide authority on the curriculum, continue to determine content, to advise on methods, and to evaluate the performance of teachers. Management, on the other hand, is eventually going to be a problem for each hospital teaching unit. It is strongly recommended that the teaching for each system be managed by a local committee consisting of a member of the systems committee and a representative from each Department actually involved in the curriculum for that particular system. This would combine the best of two approaches and ensure a degree of co-operation that will depend in the final analysis on the goodwill of the Departments.

*Graduate Teaching*

The graduate courses in this Department are expected to grow steadily in importance as the number of graduate students increases. This year course 1005 "Clinical Chemistry" was given by Dr. C. J. Porter, assisted by a number of the clinical chemists on our staff. Course 1006 "Immuno-chemistry" was given by Dr. B. Cinader and Dr. S. Dubiski, to students from several departments. Course 1007 "The Chemistry of Biological Systems" was given again by Dr. W. Paul to 7 students registered with the Institute of Bio-Medical Electronics.

A total of 7 graduate students were registered in the Department, but one withdrew in December. This left 2 candidates for the Ph.D. degree and 4 for the M.Sc. Mr. T. G. Elliott and Mr. S. D. Cooper completed work for the M.Sc. degree during the year.

Two candidates for the B.Sc. (Med.) degree are registered in the Department and Dr. D. F. Prior completed requirements for this degree.

*Postgraduate Teaching*

Members of our staff have contributed to the Advanced Postgraduate Course, and a half-day of the Refresher Course for Practising Pathologists. Dr. W. Paul has again been moderator of the Annual Course on Radioactive Isotopes.

A major development during the year has been the approval by the Senate of our Diploma Course in Clinical Chemistry. Already we have a full quota of candidates for this course and the cost of further delay in university-hospital construction will be measured in good candidates that we are forced to turn away for lack of space.

In keeping with this development we will have to provide additional courses and revise others. Our former advanced course in Pathological Chemistry has been replaced by a 6-month Residency in Clinical Biochemistry. The course in Clinical Chemistry will be modified as a course in analytical biochemistry and instrumenta-



tion. Diploma candidates will take the first half of the course in immunochemistry and will receive special instruction in biometrics and in laboratory and hospital administration. Dr. Paul's course in radioactive isotopes will be modified to meet the needs of clinical chemists.

#### STAFF

##### *Banting Division*

Although Professor J. A. Dauphinee reached retirement age during the year I am pleased to report that he has agreed to remain on staff in a part-time capacity. Professor Paul has continued to make a notable contribution to this Department and through his work on advisory committees to the University. Professor N. Z. Stanacev has established himself in research and Dr. J. G. Silah in the teaching activities of the Department. Dr. R. A. Syed left our staff in January to take a post in the United States. We were fortunate to be able to fill the vacancy with Dr. G. Feuer who comes from a productive background of research in Hungary and in England. We look forward to the return of Dr. A. D. Baines after extended postdoctoral research experience in the United States and France. He comes as Associate Professor in July and should make a distinctive contribution to our teaching programme. We expect to welcome as Assistant Professor in September K. M. Anderson, M.D., now completing a Ph.D. in Biochemistry at the University of Chicago.

It is a pleasure to record that Dr. C. C. Liew, after a highly productive year as a postdoctoral fellow, has been awarded a Canadian Heart Foundation Fellowship to extend his research experience at the University of Sussex in England.

##### *Hospital Divisions*

The Heads of the Clinical Biochemistry Departments in our teaching hospitals hold senior appointments in Pathological Chemistry and constitute a major advisory committee of the Department. Drs. S. H. Jackson, A. Malkin, C. J. Porter, A. Pollard and A. Rapoport have made important contributions to Departmental planning and policy decisions. We respect but deeply regret a decision by Dr. Rapoport to lighten his heavy academic and clinical load by reducing his responsibilities in the field of clinical biochemistry to which he has contributed so notably. Typical of his attitude is his willingness to continue to give us the benefit of his advice through a part-time cross-appointment. The Department has been pleased to add Dr. D. Borensztajn to the academic staff as Assistant Professor at Sunnybrook Hospital and expects to welcome Dr. D. Lovell to the same institution as Assistant Professor in September. These encouraging developments are offset by the dual problems of a shortage of qualified clinical biochemists to staff the laboratories in other hospitals, and the fact that a lack of adequate laboratory facilities has made it impossible to attract some that we might have obtained.

Three postdoctoral fellows, Drs. R. W. Moore, M. Abdullah and R. C. Ellis, will be on staff at Sunnybrook Hospital in the coming year. Dr. A. Hernandez will be joining the Department at the Hospital for Sick Children and Dr. D. A. G. Mickle at Toronto General Hospital, as part of their postgraduate training in Medical Biochemistry. These five men are the first candidates to be registered in our Diploma Course in Clinical Chemistry.

Visiting lecturers during 1967-68 included Dr. Morris Kates from the National Research Council, Ottawa, Canada, and Dr. K. M. Anderson from the Department of Biochemistry, University of Chicago, U.S.A.

#### RESEARCH

##### *Banting Division*

Under the overall guidance of Professor A. G. Gornall, work on the pathochemistry of cardiovascular, endocrine, metabolic and enzyme problems has continued. Day-



to-day direction of this work was assumed by Dr. C. C. Liew in his capacity as postdoctoral fellow. A good deal of progress has been made in defining the mode of action of aldosterone on heart muscle metabolism. Mrs. B. J. Cadeau, candidate for the Ph.D. degree, has studied the accumulation of dinucleotides in heart muscle cells under a variety of conditions. She is attempting to relate the levels of these enzyme co-factors to metabolic control at the mitochondrial level. Miss S. R. Huang, candidate for the M.Sc. degree, has studied the incorporation of  $^{14}\text{C}$ -orotic acid into the RNA fraction of isolated heart cell nuclei, and has shown that aldosterone alters the RNA profile. Miss Lynda C. Tyrrell, M.Sc., has collaborated in a study of RNA polymerase activity of purified heart cell nuclei. Aldosterone increases the activity of this enzyme if injected *in vivo* but has no effect on the isolated nuclei *in vitro*. This is regarded as evidence that the primary action of aldosterone is not at the level of the nucleus. Mr. F. H. Lee has assisted with studies on the effects of aldosterone and shown that it enhances oxidative phosphorylation in heart cell mitochondria. He is also studying its effects on the DNA and RNA content of purified mitochondria. Mrs. M. Kandel, with the collaboration of Dr. S. Kandel of the Faculty of Pharmacy, has studied the inhibition of bovine carbonic anhydrase by bromoacetazolamide and identified histidine as one of the binding sites at the active site of the enzyme. Evidence for a second binding site has been obtained but its nature has not yet been identified. In all this work the support of the Medical Research Council of Canada and the Ontario Heart Foundation is gratefully acknowledged.

Professor J. A. Dauphinee has continued his investigations of trace metals in various diseases and in relation to enzyme activities. Dr. D. F. Prior has completed the work for the B.Sc. (Med) degree and submitted a report of his work entitled "Penicillamine: Its Effect on the Urinary Excretion of Copper, Zinc, Calcium and Magnesium in Control Individuals and Patients with Wilson's Disease (Hepatolenticular Degeneration)." Techniques are being investigated for the separation, by chelation and other means, of the trace metals from urine and other biological fluids in order that their concentrations may be measured by neutron activation analysis. A study is being made with Professor J. C. Richardson of the Department of Medicine, of the effect of using increased dosage of D Penicillamine on selected patients with Wilson's Disease in an attempt to increase copper removal and in this way to improve the condition of the patients. The properties and significance of blood arginase have been investigated with the help of Mr. C. E. Downs. This enzyme, whose activity is manganese dependent, is present in red cells but not in plasma, and is elevated in certain cases of macrocytic anemia. It has been possible, by the use of gel filtration and ion exchange resins, to prepare red cell arginase from human erythrocytes which is quite free from the great mass of hemoglobin in these cells and further studies using this purified enzyme can now be carried out. It is with much regret that we report that Mr. Clarence E. Downs, our Chief Technician, who has been with the Department for forty-four years and who, during all this time has given devoted service, retired at the end of June 1968. His help and support is missed very much.

Professor W. Paul has continued his research on biophysical problems. The Gamma Ray Camera project, supported by a grant from the Ontario Cancer Treatment and Research Foundation, was confined for most of this year to an intensive investigation of some of the physical properties of sodium iodide scintillation crystals. This work was performed by Mr. M. L. G. Joy, of the Institute of Bio-Medical Electronics, in an effort to relate energy of gamma photons, optical "brightness," to size and shape of the scintillation material. Using the predictable light gain (amplification) in the optical system, it was concluded that a sealed crystal one-quarter inch square by one inch in height would be the optimum unit size in the gamma sensitive matrix. The third and fourth design models of the first stage image amplifier were recently delivered for testing purposes. One of them will be chosen for inclusion in the final assembly. An ear oximeter was assembled



during the past year under a grant from the Defence Research Board. The instrument was shown to have sufficient sensitivity as an oximeter but displayed a base line drift which made it unsuitable for lengthy measuring periods. Since the purpose of the instrument is to measure long term changes in arterial oxygen saturation, this defect must be eliminated to render it a useful physiological instrument. This work is now in progress.

Professor N. Z. Stanacev's research has been concerned with the study of polyglycerophosphatides in mammalian tissues. An enzyme system(s) catalyzing the incorporation of L $\alpha$ -glycerophosphate into phosphatidylglycerol in animal brain has been found. With the assistance of Mrs. D. C. Isaac and later Mrs. K. B. Brookes the general properties of the system have been established and partial characterization of the products of this reaction has been achieved. Mr. M. Hutcheon, a candidate for the B.Sc. (Med) degree, is working as a summer assistant on these problems.

Professor G. Feuer has continued the research begun in England on the mechanism of the toxic action of drugs. Striking differences have been noted in the action on the liver of rats between coumarin and 4-methylcoumarin. The oral administration of coumarin was accompanied by significant changes in the activity of various microsomal phosphatases dependent on the presence of phospholipid. On the other hand, 4-methylcoumarin caused no change in the activity of the phosphatases, but significantly increased the level of drug metabolizing enzymes.

Professor R. A. Syed, before he left the Department, completed the development of an automated fluorometric technique for the enzymatic determination of ethyl alcohol, and defined the conditions under which the method could be applied as a macro- or micro-analytical procedure.

Dr. J. G. Silah has established conditions for the quantitative assay of the enzyme necessary for the reduction of the  $\Delta^4$ -3 ketone structure of ring A of the steroid nucleus. Livers from both hypertensive rats and normotensive rats are being assayed for their content of this enzyme to test the hypothesis that hypertensive animals have a decreased ability to reduce ring A of the steroid molecule.

Miss Amy Britton has spent the past year investigating thyroid hormone metabolism in collaboration with Dr. C. Ezrin of the Department of Pathology and Dr. E. Schönbaum of the Department of Pharmacology. Disappearance of radio-active triiodothyronine was measured in the serum of patients with different clinical disorders. In spite of a computer programme analysis of the curves, no clear-cut patterns could be demonstrated.

Dr. B. A. Tobe has taken time from a busy practice to maintain an interest in the isoenzyme components of various dehydrogenase enzymes in an effort to clarify their clinical significance.

### *Hospital Divisions*

At the Hospital for Sick Children, Dr. S. H. Jackson has continued his studies on collagen metabolism in relation to wound healing. Evidence has been found that mobilization of collagen may be a major factor in response to injury and that there seems to be little or no stimulation of new collagen production. Mr. T. G. Elliott has completed the requirements for the M.Sc. degree with a thesis entitled "The Effect of Cutaneous Thermal Burns on Collagen Metabolism." Dr. Jackson has also continued collaborative studies on defects of amino acid metabolism, particularly in homocystinuria. Dr. J. G. Hill has made a study of urinary steroid excretion in the parents of children with congenital adrenal hyperplasia.

At the Toronto General Hospital Dr. C. J. Porter has continued his research interest in the porphyrins and in isoenzymes. Mr. S. D. Cooper completed the requirements for the M.Sc. degree with a thesis entitled "The Metabolism of Porphyrins - The effects of inducing chemicals on porphyrin biosynthesis in the photosynthetic bacterium *Rhodospseudomonas spheroides*." Mrs. F. Bobik-Orchard is also a graduate student completing her studies on the alkaline phosphatase isoenzymes.



With the help of Mr. Kalweit, research on an automated calcium analysis by atomic absorption, and on agarose fluid gel electrophoresis of proteins, is in progress. Mrs. S. Bjerre has developed a direct kinetic spectrophotometric assay of aminopeptidase in serum using L-leucyl- $\beta$ -naphthylamide as substrate.

At the Toronto Western Hospital Dr. A. Rapoport and Dr. H. Husdan have completed a comparison study of creatinine and inulin clearances measured in the same subjects in health and disease. They have also compared serum and urine osmolalities in normal and diseased subjects during progressive dehydration and fasting over a period of 30 hours. They are studying the renal excretion of hydroxyproline in bone disease and the renal control, by means of clearances, of free and peptide hydroxyproline. A micro-kjeldahl, wet-digestion procedure has been modified for the estimation of calcium, magnesium and phosphorus in diet and stool. In stool these elements can be measured with or without the presence of a chromium marker. Dr. R. R. Ogilvie has investigated the automation of serum and urine calcium determinations by fluorometry and studied the identification of barbiturates by thin layer chromatography. Dr. S. Dubiski has continued his research on problems related to antibody synthesis. Genetic factors that regulate antibody synthesis and methods by which this control can be overruled were studied. These research activities were supported by the Medical Research Council of Canada, Canadian Arthritis & Rheumatism Society and the Toronto Western Hospital. Dr. N. D. Schnuda has begun a research project as a graduate student working toward his Ph.D. in Pathological Chemistry.

At Sunnybrook Hospital Dr. D. Z. Borensztajn has initiated a programme of research on the metabolic changes in affective disorders. It is gratifying for our Department to resume an interest in the biochemical aspects of mental illness.

At the Princess Margaret Hospital Dr. B. Cinader and his colleagues have been concerned with regulatory problems of the antibody response. In this context they have studied acquired immunological tolerance in model systems and in systems in which autologous tolerance played an important part. In collaboration with Dr. S. Dubiski, population studies of antibody forming cells in normal immunized and in immuno-suppressed immunized animals were carried out. Genetic aspects of the immune response (control of inheritance of responsiveness, allotypy and of the complement system) were studied on various levels. The effect of enzyme antibodies on the conformation of antigens was analyzed with fractions of enzyme-antibodies which increase the catalytic activity of ribonuclease. Problems of the immunotherapy of tumours were investigated and clinical trials were conducted.

At the New Mount Sinai Hospital, Dr. A. Pollard has resumed his research on the development of fully automated methods for the measurement of minute quantities of proteins and polypeptides in body fluids by radioimmunoassay.

Dr. J. S. Olin has organized the Acute Medical Hospital for the Addiction Research Foundation and with Dr. G. Sereny and several collaborators has initiated a number of research studies in their patients.

#### HONOURS

PROFESSOR J. A. DAUPHINEE and PROFESSOR S. H. JACKSON were the recipients of Centennial Medals.

DR. H. HUSDAN has been elected a Fellow of the Royal Institute of Chemistry, Great Britain.

DR. B. A. TOBE has been made a Fellow of the American College of Physicians.

#### SCHOLARLY ADDRESSES

B. CINADER addressed the Clinical Cancer Research Conference at Lake Couchiching, Ontario, on "Prospects and Perspectives in Immunotherapy"; as visiting professor in Edmonton, Alberta, the medical staff of the Paediatric Ward,



University Hospital, on "Tolerance Regulation"; and at the University of Western Ontario spoke on "The Place of Immunology in a Modern Medical School."

S. DUBISKI presented a communication at the Annual Meeting of the Federation of American Societies for Experimental Biology: "Changes in the Conformation of the Heavy Chains of Rabbit Immunoglobulin which depend on the Allotypic Specificity of the Light Chains."

C. C. LIEW spoke on "The Molecular Basis of Aldosterone Action in Heart Muscle," at the 7th International Congress of Biochemistry, Tokyo; "Effects of Aldosterone on the Rate of RNA Synthesis in Vivo" at the Annual Meeting of the Federation of American Societies for Experimental Biology, Atlantic City; and "An Effect of Aldosterone on the Activity of RNA Polymerase in Heart Cell Nuclei" at the June 1968 Meeting of the Canadian Federation of Biological Societies.

C. J. PORTER delivered an address on "Clinical Chemistry in Canada" at the National Meeting of the American Association of Clinical Chemists.

A. Rapoport spoke at the Opening of the Dialysis Centre, St. Joseph's Hospital, Hamilton, on "Renal Hypertension - Diagnostic Procedures"; on "Focal Proliferative Glomerulo-Nephritis" before the American Society of Nephrology in Los Angeles; at the Academy of Medicine, Ottawa, on "Some Tactical Problems in Hypertension"; at the Annual Meeting of the Royal College of Physicians and Surgeons in Toronto, on "Creatinine Clearance and Serum Creatinine in the Assessment of Renal Function"; and on "The Assessment of Kidney Function," in the Programme of Clinically Applied Basic Sciences at Dalhousie University.

N. Z. STANACEV lectured on "Comparative Biosynthesis of Polyglycerophosphatides in Bacteria and in Mammalian Tissue" at the Centre de Neurochimie, Centre National de la Recherche Scientifique, Strasbourg, in June 1968.

B. A. TOBE spoke on "Enzymes in Clinical Medicine" at the Royal College of Physicians Meeting in January 1968.

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## PATHOLOGY

*Under the direction of Professor A. C. Ritchie*

As in previous years, this report must begin by stressing the increasingly urgent need to increase the staff and facilities of the Department. In no Hospital do we have the staff or the facilities needed to develop the outstanding clinical services proper to a Teaching Hospital; in no Hospital do we have the men, space or time to develop fully the graduate and postgraduate programmes we need; we lack the men and facilities needed to improve undergraduate teaching and take advantage of the new methods now available; and we lack men with time to devote to the many meetings and committees that deserve support. Perhaps our most urgent task is to attract the additional staff we so badly need, and to find them appropriate facilities. If we are to meet the demands of the near future, it is most urgent that we begin this task without delay.

In the past year, the undergraduate course in General Pathology for Medical Students was presented as usual in the first two terms of the Second Medical Year. Graduate students in Dentistry, Art as Applied to Medicine, and certain other Graduate Departments were also admitted to the course. This year, the great majority of the lectures were given by Dr. A. C. Ritchie. In previous years, an increasing number of lecturers had been used, so that experts could speak on their own subject. This policy did not prove successful. The quality of the lectures varied widely; the students had no opportunity to become accustomed to the style of the lecturers; and it often proved difficult for the students to relate the matter presented to their overall understanding of the subject. Too often, a lecturer would dwell on minutiae of his own interest instead of giving the over view needed at this stage, and relating the subject under discussion to the students' growing understanding of medicine. The use of a single lecturer for much of the course seemed to allow a more satisfactory development of the students' knowledge. Another improvement introduced this year was the extensive use of cyclostyled lecture notes, usually handed out after the lecture. Many students seemed to find them of considerable assistance. The demonstrations again posed many problems. This part of the course could be greatly improved, if more staff time were available, both to prepare the classes more thoroughly and to develop the many teaching aids that would be of great assistance in this aspect of the work.

The course in Special Pathology for Medical Students begins in the third term of the Second Medical Year and continues until the end of the Third Medical Year. This year, the cardiovascular system, the respiratory system, the gastrointestinal system and the renal system were discussed during the Second Medical Year, leaving the remainder of the systems for the Third Medical Year. The subjects presented in the Second Medical Year are presented by lecture and demonstration,



but unfortunately in the Third Medical Year there is only opportunity for lectures. Once again, the weakest part of the course was in the demonstrations. If more staff and more time were available to prepare the classes more thoroughly and to make the many teaching aids that would be of great value, the course could be greatly improved. It should also be remembered that if the kind of group teaching sometimes envisioned for Period II of the New Curriculum is to be introduced, it is urgent that these teaching aids be produced now. They will be essential for the New Curriculum and time is short. As in previous years, case presentations proved a valuable form of instruction and the integration of the courses in haematology given during the Third Medical Year by the Departments of Medicine and Pathology proved helpful.

The course in General Pathology for Dental Students was directed by Dr. N. S. Taichman. The course was presented by lecture and demonstration, as in the past. This year the content of the course was modified, to bring it closer to the needs of the Dental Students, and the conduct of the demonstrations was much improved. Again, more staff time and more aids are needed.

The lecture course for students of Physical and Occupational Therapy was organized by Dr. Susan Ritchie. The Department also shared in the courses arranged by the Canadian School of Embalming and the Toronto Institute for Pastoral Training.

With the introduction of the new examinations in Laboratory Medicine by the Royal College of Physicians and Surgeons of Canada, it has become necessary to reconsider our residency training programmes. Discussions are continuing within the Department and with the other Departments closely concerned, particularly the Department of Pathological Chemistry and the Department of Bacteriology. Probably the time has come to introduce a more formal training programme in which the residency essential training will be supplemented by a seminar course in which the aspects of the subject not well covered during the residency training can be developed. It is expected that new programmes leading to the qualifications in Anatomical Pathology, Haematological Pathology, Neuropathology, and General Pathology will be announced during the next few months. This facet of the Department's work is becoming increasingly important. The need for more pathologists in Canada is very great, and it is clear that it is our responsibility to increase our postgraduate programmes to bear our share in training the men needed.

This aspect of the Department's work is intimately bound up with its clinical responsibilities. The men in our postgraduate programmes are training in various aspects of clinical medicine, and it is only by working on our clinical services that they can be trained. The quality of our clinical services is, therefore, of immediate relevance to our postgraduate programmes. These services all need expansion. The increasing subspecialization now unavoidable in all branches of medicine places a very heavy load on the Department. In Pathology, as in most other departments, it is now necessary to have men who confine their practice to one small aspect of the subject, as for example to cardiovascular disease, to renal disease, or to immunopathology. Only in this way can we meet the demands of modern medical practice, provide the clinical service needed by the patients in the Teaching Hospitals, and develop the postgraduate programmes that are so urgently needed. Indeed, this development of the Department is also essential if we are to maintain the quality of our other programmes, for undergraduate and graduate students. All depend in large part on the quality of our clinical services. It is therefore of the greatest importance that we enlarge the staffs in our Teaching Hospitals, to permit the provision of the appropriate subspecialists, and that we provide them with the necessary facilities for their work, and the time needed for the research which is an essential component of it.

The heavy load of teaching given under the Division of Postgraduate Medical Education to men training in other specialties continued. Some 200 hours of lectures and seminars were delivered. Many members of the Department shared in the work, but as in past years, the load fell principally on Dr. W. Anderson.



The Refresher Course for Pathologists in Practice was again organized by Dr. H. T. G. Strawbridge, in co-operation with the Departments of Pathological Chemistry and Bacteriology. Some 50 pathologists registered and again the course proved most successful. It is clear that it meets a need, and also that it indicates a field in which more endeavour would be desirable.

Also under the auspices of the Division of Postgraduate Medical Education was the course in Otolaryngological Pathology organized conjointly with the Department of Otolaryngology. This course was given by Professor I. Friedmann of the University of London, assisted by members of the departments concerned, and also proved successful.

In the School of Graduate Studies, the Advanced Course in Pathology was organized by Dr. H. Z. Movat, and a number of visiting speakers took part. Four students were registered for the degree of Master of Science and one for the Doctorate in Philosophy. Two were successful in obtaining the degree of Master of Science, and three the degree of Doctor of Philosophy.

Five students were continuing in the summer programme for the B.Sc.(Med), and one was enrolled in the sessional programme. One was awarded the degree.

During the year, a Division of General and Experimental Pathology was set up in the Department, and Dr. Movat became its first Head. The Division will be housed in the Medical Sciences Building.

We are glad to welcome several new members to the staff. Dr. B. Cruickshank, Chairman of the Department of Pathology in the University College of Rhodesia, has taken up his appointment as Pathologist-in-Chief at Sunnybrook Hospital and as a Professor of Pathology. Dr. G. Simon, who came as a Visiting Assistant Professor from the University of Geneva has decided to remain in Canada, and has joined the staff as an Assistant Professor. Dr. J. Hayes has come from the University of the West Indies to take up a post as Pathologist to the Toronto General Hospital and Assistant Professor. Dr. P. Pinkerton has taken up his post in charge of the Department of Laboratory Haematology at Sunnybrook Hospital and as an Assistant Professor. Other new appointments include Dr. A. J. Barson to the Hospital for Sick Children, Dr. Ozge-Anwar to Sunnybrook Hospital, Dr. A. Raick in the Banting Institute, Dr. M. Lipa to the Toronto Western Hospital, Dr. B. Oliver to the Toronto General Hospital, Dr. N. B. Medline to St. Michael's Hospital, Dr. K. Miyai to the Banting Institute, Dr. N. S. Taichman to the Toronto Western Hospital, and Dr. K. Udaka to the Banting Institute.

We were sorry to lose several members of the Department. Dr. M. J. Phillips resigned to take up a post in McGill University, Dr. A.-M. Jézéquel transferred to the Department of Anatomy, Dr. H. J. Barrie resigned on leaving his post at Sunnybrook Hospital, Dr. P. Wentworth on leaving the Hospital for Sick Children, and Dr. A. B. Lakshman on joining the staff of Laurentian University.

Among the many distinguished visitors to the Department were Dr. Basil Morson of St. Mark's Hospital, London; Professor Christian deDuve of Brussels and New York; Dr. Jeorh Jensen of the University of Miami; Dr. William Mair of the National Hospital for Nervous Diseases, London; Dr. Peter Thomas of the Royal Free Hospital, London; Dr. King Engle, of the National Institutes of Health, Bethesda; Dr. D. C. Gajdusek, of the National Institutes of Health, Bethesda; Professor I. Friedmann of the University of London; Dr. G. Loewi, of the Canadian Red Cross Memorial Hospital, Taplow; Dr. Hugh Starkey of Montreal; Dr. Robert Wissler of the University of Chicago; Dr. A. G. Sanders, of the University of Oxford; Dr. K. Ishizaka of the Children's Asthma Research Foundation, Denver; Dr. Peter Ward, of the Armed Forces Institute of Pathology, Washington.

#### RESEARCH

The research work of the Department continues to expand. Although no major alterations have been made in the facilities, improvements have been effected in the



Banting Institute and in several of the hospitals. New electron microscopes have been installed in the Banting Institute and the Princess Margaret Hospital and new space is becoming available in St. Michael's Hospital.

The studies of carcinogenesis have continued in the Banting Institute. Dr. Miyai, Dr. Raick, Dr. Moscarello and Dr. Simon are now associated with Dr. Ritchie in this work. A pure substance believed to be the promoting agent in croton oil has been isolated by Professor Jones of the Department of Chemistry, and its biological activity is now being tested by Dr. Raick. It is hoped to investigate the problem *in vivo* and *in vitro*. Dr. Raick is also investigating the action of carcinogens related to benzanthrane on the skin and the liver. Dr. Miyai is continuing his work on the effects of ethionine on the liver, with particular relation to its effect on the nucleus and nucleolus, and to the mechanisms by which certain agents interfere with its carcinogenic action.

With Dr. Curry, Dr. Simon has been studying the fine structure of the mouse lung, to elucidate the early changes which occur during the induction of pulmonary adenomata by uracil mustard. He has also begun a study of the spleen in NZB mice, to determine the changes which take place during the lupus-like disease these animals develop, and to study the genesis of the reticulum cell sarcomata which develop in these mice in high incidence.

Dr. Pinkerton and Dr. Simon are beginning a study of the ultra-structural histology of the duodenum in the mouse, as a beginning of an investigation of the malabsorption of iron found in mice of the C57BC/6 JAX strain.

With Miss Kovacs, Dr. Moscarello has been studying changes in the ribosomes during aminonucleoside intoxication and with Dr. Lewin has investigated the ultrastructural and biochemical changes produced in the kidney and liver during aminonucleoside nephrosis.

Dr. Movat has continued his studies of immunopathology, paying particular attention to the activation of the kinin system by antigen-antibody aggregates and the isolation and identification of the biologically active components in the system. He has also studied the phlogistic agents derived from the lysosomes of polymorphonuclear leukocytes. Dr. Udaka isolated the mediators of inflammation from lesions caused by immunological or non-specific injury.

Dr. Anderson in conjunction with Dr. Macnab and Dr. Rathbun has been studying the microcirculation in tendons using a logetric enlarger. This group has also studied the lesions of tendon degeneration and the effects and sequelae of microinfarcts of bone. With Dr. Bryce, Dr. Anderson has studied cases of carcinoma of the larynx, utilizing large, undecalcified sections. Dr. Anderson's studies utilizing undecalcified bone sections are also continuing. Dr. D. W. Thompson has continued his work on various aspects of cytopathology.

Dr. M. D. Silver with Dr. Gardner investigated the fine structure of platelets, with particular reference to their microtubules and microfilaments. They also confirmed the localization of serotonin in the cell. Dr. Silver has also continued his studies with rabbit ear chambers, and has begun to study the effect of lipid feeding on the aggregation of platelets.

Dr. Ezrin with Dr. Bain has defined the cell in the human hypophysis responsible for producing the luteinizing hormone. With Dr. Lesk, he has shown that excessive glucocorticoid levels cause a fibrillar replacement of normal cytoplasmic constituents in a subtype of basophil. With Dr. Lakshman, Dr. Ezrin showed that an ovulation-inducing drug stimulated the pituitary gonadotropes in the rhesus monkey, and that birth control pills inhibited it.

Mrs. Crookston has continued to study the red cell antigens in health and disease, and the specificity and behaviour of auto-antibodies. Dr. Bell has begun a study of the incidence of common sex chromosome anomalies in newborns in Toronto. Nine cases have been found in 8,000 births. Dr. Susan Ritchie has studied cases of Whipple's disease and leprosy by electron microscopy.

Dr. Rabinovich has begun a study of the metabolic alterations in bone, in



co-operation with the Departments of Medicine, Radiology and Surgery. Dr. Sepp with Dr. LeRiche has investigated the nasal carriage of staphylococci among hospital personnel, and the effect of lystostaphin on the carriage rates. Dr. Taichman is working on several aspects of the inflammatory reaction, the pathogenesis of the haemorrhagic necrosis provoked by bacterial endotoxin in rabbits infected by vaccinia virus, the mediators of tissue injury in the dermal Arthus reaction, the production of a lysomal laibilizer in the skin and conjunctiva, and the effect of this agent, antigen-antibody complexes and endotoxin on the release of lysosomes from polymorphonuclear leukocytes. He is also studying the fine structure of human gingiva.

Dr. Abbott has investigated the CA-7 fibrinolytic agent, determining its effect on coagulation *in vitro*, the levels of its inhibitor in the general population, and with Dr. Koven has attempted to evaluate its clinical value.

Dr. Conen has continued his studies of human chromosomes, and is studying the patterns in normal individuals. He is also investigating the chromosomal abnormalities in leukaemia and in teratomata. With the electron microscope, he is continuing his work on the respiratory distress syndrome and pulmonary hypertension, his studies of dystrophic muscle, and his investigation of the ultrastructure of tumour cells. Dr. Lynch has studied thyroid atrophy in cystine storage disease and the mucosal changes in coeliac disease.

Dr. Ross with Dr. Nopajaroosri has studied the mucinous lesions of the appendix. Dr. Katz has begun an investigation of the role of viruses in subacute thyroiditis.

Dr. Young has continued his studies of the value of the units used to measure laboratory work in hospitals, and is nearing a definition of new units. He has also studied the value and effect of unsolicited laboratory information on the diagnosis and care of patients.

#### HONOURS

DR. RITCHIE was elected President of the Canadian Association of Pathologists and President of the Seventh International Congress of Clinical Pathology. He also was elected to the Council of the Section of Clinical Pathology of the Ontario Medical Association and was appointed a member of the Advisory Council to the Forensic Sciences Centre.

DR. REWCASTLE was elected Secretary of the Canadian Association of Neuropathologists, Canadian Representative to the International Society of Neuropathologists, and Secretary of the Section of Neuropathology of the Academy of Medicine, Toronto.

DR. H. Z. MOVAT was appointed to the National Board of Medical Examiners (U.S.).

MRS. CROOKSTON was named Contributing Editor to *Vox Sanguis*.

DR. RABINOVICH was elected Chairman of the Section of Pathology of the Academy of Medicine of Toronto.

DR. PANTALONY was elected Secretary of the Section of Haematology of the Ontario Medical Association and a Fellow of the American Association of Clinical Pathologists.

DR. STRAWBRIDGE was appointed President and Chairman of the Board of Governors of the Toronto Institute of Medical Technology and a Member of the Subcommittee on Centralization and Regionalization of the Ontario Council of Health.

DR. LYNCH was elected Vice-Chairman of the Section of Pathology of the Ontario Medical Association.

DR. KATZ is the Secretary of the Section of Pathology of the Academy of Medicine of Toronto.

DR. VAN PATTTER was the Chairman of the Board of Examiners for Certification in Pathology of the Royal College of Physicians and Surgeons of Canada.

DR. MCGEE is Secretary of the Toronto East Medical Association.



## SCHOLARLY ADDRESSES

Dr. Ritchie served as Moderator at a discussion of lesions of the gastro-intestinal tract at the Annual Meeting of the Canadian Association of Pathologists at Banff. Dr. Movat spoke on "The Kinin System and Its Activation by Antigen-Antibody Aggregates" at a symposium on the acute inflammatory reaction at the meeting of the American Association of Pathologists in Chicago, and on "*In Vitro* Release of Permeability Factors and a Slow Reacting Substance from Phagocytosing Leukocytes" and "Activation of the Kinin System by Ag-Ab Aggregates" before the Federation of American Societies of Experimental Biology at Atlantic City. Dr. Udaka addressed the Canadian Federation of Biological Societies meeting at Kingston on "Simple Physicochemical Assay for the Quantitative Assay of Increased Vascular Permeability in Inflammation" and the 24th International Congress of Physiological Sciences in Washington on "Comparative Study of Vasoactive Peptides in Inflammation." Dr. Ezrin spoke to The Royal College of Physicians and Surgeons of Canada in Toronto on Crooke's hyaline cells, and to the 6th International Congress on Fertility and Sterility in Tel Aviv on the effect of drugs on the gonadotrophs of the pituitary. Mrs. Crookston spoke on "Compatibility Tests" and "Cold Agglutinins" at a course sponsored by the University of Washington and the Blood Bank in Seattle. With Dr. Finlay and Dr. Phillips, Dr. Susan Ritchie, spoke on Whipple's Disease to the Canadian Association of Pathologists in Banff. Dr. McLeish spoke to the same body on "Sideroblastic Anaemias." Dr. Rewcastle and Dr. Amacher addressed the Royal College of Physicians and Surgeons of Canada in Toronto on "Reticulo-Microgliomatosis: with Special Reference to Prognosis." Dr. Rewcastle and Dr. Ball spoke to the Canadian Association of Neuropathologists in Montreal and to the Academy of Medicine of Toronto on "Electron Microscopic Study of the Inclusion Bodies in Pick's Disease." Dr. Rewcastle with Dr. Humphrey and Dr. Preston spoke to the Academy of Medicine on "Phosphorylase Deficiency Myopathy," and Dr. Rewcastle addressed the Montreal Neurological Society on "The Mammalian Subarachnoid Space and the Fate of Injected Particulate Material." Dr. Taichman gave a paper on "Potential Mechanisms of Tissue Destruction in Periodontal Disease" at a symposium on microbial agents and the production of oral diseases before the International Association for Dental Research at San Francisco, and spoke on "Mechanisms of Tissue Injury during Inflammation and Hypersensitivity" in a symposium before the American Academy of Periodontology in New York. Dr. Pantalony spoke to the Ontario Society of Medical Technologists on "Automation in Haematology." Dr. Conen with Dr. Erkman spoke on "Clonal Evolution of Karyotype in Leukaemia" at the Canadian Federation of Biological Societies in Montreal; with Dr. Balis and Dr. Bell on "Problems in Myogenesis Terminology in Electron Microscopy" to the Electron Microscopy Society of America in Chicago; on "Chromosome Patterns and Numbers in Leukaemias and Other Neoplasms" to the Clinical Conference of the Ontario Cancer Treatment and Research Foundation at Lake Couchiching; with Dr. Rance, on "Familial Nephrotic Syndrome," to the American Society of Nephrologists at Los Angeles; with Dr. Hampole on the "Chromosomal Abnormalities in Patients with Syndactyly" to the American Society of Human Genetics in Toronto; on the "Use of Thin Plastic-Embedded Sections in Surgical Pathology" to the Pediatric Pathology Club at Chicago; with Dr. Erkman and Dr. Glockmann on the "Chromosomal Abnormalities in a Childhood Autopsy Population" at the American Association of Pathologists and Bacteriologists in Chicago; with Dr. Chan and Dr. Balis on "The Effect of Post-Lathyrus Medical Scar" to the American Association of Pathologists and Bacteriologists in Chicago; with Dr. Bhagwat on the "Characterization of 'Desquamated Alveolar Cells' (DAC) in Experimental Desquamative Interstitial Pneumonia (EDIP)" to the International Academy of Pathology in Chicago; and on "The Alveolar Macrophage" to the American Society of Experimental Pathology at Atlantic City; with Dr. Lowden and Dr. Wentworth on "Juvenile Cerebral Lipidosis: a Disorder of Ganglioside Metabolism"



to the American Pediatric Society at Atlantic City, and with Dr. Erkman on "Chromosome Studies on Splenic Tissue" to the Canadian Society of Cell Biology at Kingston. Dr. Donohue spoke on problems in paediatric pathology to the International Academy of Pathology in Chicago, and Dr. Lynch addressed this meeting on a "Simplified Gold Staining of the Nervous System." With Dr. Chan, Dr. Ezrin, Dr. Bailey, Dr. Schönbaum and Dr. Fraser, Dr. Lynch spoke to the American Association of Pathologists on "The Thyroid in Cystinosis." Dr. Van Patter served as a panelist at the meeting of the Canadian Cytology Council at Banff. Dr. Silver spoke on "Electron Microscopy" at the meeting of the Ontario Society of Medical Technologists in Toronto.

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- URIUHARA, T., and MOVAT, H. Z. "The Role of PMN-Leukocyte Lysosomes in Tissue Injury, Inflammation and Hypersensitivity. V. Partial Suppression in Leukopenic Rabbits of Vascular Hypersensitivity due to Thermal Injury" (*Proceedings of the Society of Experimental and Biological Medicine*, vol. 124, no. 1, Jan. 1967, pp. 279-84).
- WALTER, J. B. *Principles of Pathology for Dental Students*. London: J. & A. Churchill Ltd., 1967. Pp. 437.
- WENTWORTH, P. "Placental Inarction and Toxemia of Pregnancy" (*American Journal of Obstetrics and Gynecology*, vol. 99, no. 3, Oct. 1967, pp. 318-26).

## PHARMACOLOGY

### *Under the direction of Professor W. Kalow*

There have been no major changes in undergraduate teaching during the past year. However, much preparatory work has been performed which will affect teaching in years to come. Teaching of Pharmacology to the young medical student will increasingly emphasize general principles pertaining to action and fate of drugs in the body. The pharmacological material closely related to therapeutic application of drugs will be taught to the medical students during their clinical years. Staff participation on committees concerned with the new medical curriculum is listed below. Besides the medical courses, all Pharmacology courses offered to non-medical students have been critically reviewed and substantial changes are being prepared.

Professor	Committee	Period	Capacity
D. M. Derry	Gastrointestinal	II	Adviser
C. H. Hockman	Nervous System	I	Consultant
	Behavioural Sci.	II	Adviser
G. E. Johnson	Nervous System	I	Member
H. Kalant	Nervous System	I	Chairman
	Pharmacol. Topics	I	Member
	Nervous System	II	Member
W. Kalow	Pharmacol. Topics	I	Chairman
	Nervous System	I	Consultant
	Physiol.	I	Member
M. A. Kumar	Gastrointestinal	I	Member
W. A. Mahon	Cardiovascular	II	Member
I. C. Radde	Repro. and Neonatology	II	Member
W. H. E. Roschlau	Infections	II	Adviser
	Hematology	II	Adviser



E. Schönbaum	Endocrine	I	Member
P. Seeman	Histology	I	Consultant
	Gen. Pathol. Processes	II	Adviser
	Musculoskeletal	II	Adviser
E. A. Sellers	_____	I	Co-ordinator
	Endocrinology	II	Member
	Pharmacol. Topics	I	Member
A. K. Sen	Genitourinary	I	Member
F. Sunahara	Cardiovascular	I	Member
	Resp. System	I	Member
E. L. Thomas	Nervous System	I	Consultant
	Resp. System	II	Member
T. T. Zsoter	Genitourinary	I	Adviser

During the year, the death of Professor H. Ward Smith in the midst of an active life was a serious loss to the Department.

It is a pleasure to be able to report that Dr. Philip Seeman and Dr. David Derry joined the Department as Assistant Professors. In addition we welcomed three Visiting Professors: Dr. Jaime Talesnik came from the University of Chile, Santiago, Chile; Dr. K. E. Livingston arrived from the University of Minnesota to spend part-time in this Department. He and Professor Talesnik joined Professor Hockman to form a neuropharmacology team. Dr. Oleh Hornykiewicz arrived from the Department of Pharmacology in Vienna. His visit is jointly sponsored by the Departments of Pharmacology and Psychiatry. We are grateful for the enrichment which the presence of the visitors has brought to this Department.

The summer student programme is still growing. Increased University and Extramural support is gratefully acknowledged. Extramural support: Burroughs Wellcome & Company (Canada) Ltd., CIBA Company Limited, and Geigy (Canada) Ltd.

Graduate students have completed the following theses for the M.Sc. degree: Melvin S. Grossman, "The Effects of Hydrolytic Enzymes on the Pharmacology of Isolated Muscle Preparations"; Eugene Leblanc, "Methodological Studies on the Measurement of Ethanol Intoxication and Acquired Tolerance in Rats."

Among the many visitors to the Department of Pharmacology were Dr. P. Stern, Institut za Farmakologiju, Medicinskog Fakulteta, Sarajevo, Yugoslavia; Dr. L. Spero, Downstate Medical Center, State University of New York; Dr. A. S. V. Burgen, Department of Pharmacology, University of Cambridge, Cambridge, England; Dr. M. P. Earles, Chelsea College of Science, London, England; Dr. Ian Geddes, Department of Anaesthesia, University of Liverpool, Liverpool, England; Dr. C. C. Gale, Regional Primate Research Center, University of Washington, Seattle; and Dr. H. Blaschko, Department of Pharmacology, Oxford University, England.

#### RESEARCH

In Professor Kalow's section, Dr. B. A. Britt continued studies on a rare complication of general anaesthesia which has become known under the name of malignant hyperthermia. Analysis of numerous cases shows that there are two different clinical entities hidden under that name. One of these is hereditary and characterized by the appearance of rigidity which may be triggered by succinylcholine. To find the cause of this abnormal reaction, Mr. I. Gallimore is making model studies on isolated muscle and Miss J. Hards is studying isolated cells. Dr. Brebner, aided for several months by Dr. Blinoff, purified enzymes, particularly esterases, from human lung tissue in order to clarify certain aspects of the fate of drugs in the body.

Dr. T. H. Holmes continued his study of the reaction of patients to adrenaline and other catecholamines in relation to levels of steroid hormones. The support of his efforts by Dr. C. Wolfe in the Department of Medicine is gratefully acknowledged.

The computer studies of Dr. L. Endrenyi on the resolution of overlapping



Gaussian peaks demonstrated the large bias inherent in the usually applied methods of area estimation. The superiority of other methods of measurement was shown and correction diagrams were developed.

The addictions research group, under the direction of Professor H. Kalant, has extended its studies of metabolic and nervous system tolerance to alcohols, barbiturates, and other drugs of dependency. The metabolic studies under the immediate supervision of Dr. J. M. Khanna have progressed substantially. A study of  $^{14}\text{C}$ -palmitate turnover in fatty livers of alcohol-treated rats, done by G. Bustos with the help of S. Berger and D. Frost, is almost complete and ready for computer analysis. With the help of Mrs. J. Loth, liver nucleotide levels have been measured in animals on chronic ethanol treatment and found to be disturbed only while alcohol is actually being metabolized. Alcohol-treated animals have been found to be abnormally resistant to barbiturates, and Dr. J. Marshman and Miss P. Norton are investigating whether this is due to more rapid drug metabolism, or greater resistance of the nervous system. A. E. LeBlanc has developed a micromethod for gas chromatographic analysis of ethanol and acetaldehyde in 0.1 ml. of blood. Using this technique, and with the help of Mrs. G. Stewart and Miss M. Guttman, he has found that metronidazole, unlike Antabuse, does not cause acetaldehyde to accumulate in the blood after administration of alcohol. D. W. Haist has achieved a substantial purification of alcohol dehydrogenase from rat liver by a combination of ammonium sulphate fractionation and a combination of ion exchange and gel filtration chromatography.

In other studies, in collaboration with Dr. R. J. Gibbons of the Addictions Research Foundation, A. E. LeBlanc, N. Berman and Dr. Marshman have proven conclusively that nervous system tolerance to ethanol and to barbiturates can be acquired within days, and lost equally rapidly on cessation of dosage. This may require a major revision in the concept of organic change in human alcoholism. W. Grose is comparing the effects of alcohol and barbiturates *in vitro* on the release of acetylcholine from electrically stimulated slices of brain cortex from normal animals and from those previously made tolerant to these drugs. Dr. M. Willinsky has begun a study of the tissue distribution and pharmacological effects of tetrahydrocannabinol, after acute and chronic administration in experimental animals; he is attempting to develop micro-analytical methods suitable for use with tissue extracts. K. J. Ryan is testing the applicability of particle electrophoresis as a means of obtaining suspensions of synaptosomes from brain in sufficient purity for use in drug studies. A. Chaiton has examined in depth the apparent activation of brain ATPase activity by freezing and its relation to integrity of cell membrane structures.

Professor C. H. Hockman, in collaboration with Dr. J. Talesnik and Dr. K. Livingston, has discovered a striking phenomenon, i.e., modulation of cardiovascular reflexes by simultaneous electrical stimulation of various parts of the brain, especially in the limbic system. This may prove to be of great importance in the mechanism of emotional influences on physiological functions and may help to explain the major actions of tranquillizers, alcohols, and certain other groups of drugs with addictive liability. The amygdala has been "mapped" in detail with discrete electrical stimuli, to examine the implication of the forebrain in the regulation of cardiovascular function. A similar study of the cerebellum by Miss T. Mueller has been completed. In another project Dr. Hockman has examined the effects of small doses of alcohol, a barbiturate, a tranquillizer, and an antihistaminic on auditory evoked potentials in the electro-encephalogram of human subjects.

Professor E. A. Sellers, Professor E. Schönbaum and their collaborators continued their studies of pituitary-thyroid interactions as well as their experiments concerning the role of thyroid and sympathetic nervous systems in thermoregulation. Jointly with their clinical colleagues, Mrs. M-L. D. Schönbaum and Professor Schönbaum continued the study of Long-Acting Thyroid Stimulator (LATS) in Graves' disease, particularly after thyroid radioblation. Mrs. Schönbaum and Professor Sellers continued their studies of serum thyrotropin levels in health and disease.



A collaboration has been started by Mrs. Schönbaum and Dr. C. C. Gale, Regional Primate Research Centre, University of Washington, Seattle, to study thermoregulatory effects on thyrotropin levels in baboons. Professor Sellers and Mrs. Schönbaum also continued their investigation of the mode(s) of action of very small amounts of thyrotropin, and LATS. Drs. Schönbaum, Sellers and Derry, in collaboration with Dr. G. Steiner (MRC Scholar, Department of Medicine) continued their studies on the sympathetic nervous system by investigating the responses of immunosympathectomized rats to cold-acclimation. This work, described by Dr. Derry, led to the postulate that in brown adipose tissue a dual sympathetic innervation can be observed. The implications of these findings on temperature regulation during cold exposure are now under study. Early in 1968, the book *Mammalian Hibernation III* appeared; Dr. E. Schönbaum was one of the editors.

Professor D. Derry commenced his studies of the effects of drugs on the autonomic nervous system by developing, in collaboration with Drs. Schönbaum and Sellers, a simple and rapid method for the visualization of adrenergic nerve fibres. With this technique, a modification of that of Falck (University of Lund, Sweden), it was possible to demonstrate for the first time a parenchymal sympathetic innervation in brown adipose tissue. It appears that brown adipose tissue, similar to various gonadal tissues, has a dual innervation. A study of the actions and interactions of drugs such as reserpine and  $\alpha$ -methyl dopa on adipose tissue has been started.

Research conducted in Professor G. E. Johnson's laboratory during the past year was directed towards studies of the influence of environmental temperature on the activity of the sympathetic nervous system. The evidence that short and long term cold exposure increased the secretion of noradrenaline was confirmed. An increased rate of synthesis of noradrenaline during cold exposure was also demonstrated by the increased excretion rate of 3-methoxy-4-hydroxyphenylglycol, the metabolite which is formed mainly from the intraneuronal degradation of noradrenaline.

The influence of heat stress on catecholamine secretion was also studied. On exposure of animals to 36°C, the secretion of noradrenaline increased but secretion was not accompanied by an increased rate of synthesis which is suggestive of a breakdown in synthesis at this temperature.

The formation and release of the false transmitter metaraminol during exposure to cold and warm environments were also investigated. Cold exposure increased both the rate of formation of metaraminol from injected alpha-methyl-m-tyrosine and the release of metaraminol from sympathetically innervated tissues. These results support the concept that the metaraminol may serve as a false sympathetic transmitter.

Studies of the effect of the drug Prenylamine Lactate on sympathetic activity were completed during the past year. The results of these studies illustrated that the mechanism of Prenylamine Lactate's relief of angina pectoris is not mediated through sympathetic inhibition.

In Professor Kumar's section, a method for the extraction and assay of human plasma calcitonin was developed. It is being perfected for routine use in human disorders of calcium metabolism. Dr. Sturtridge continued research on the effects of calcitonin deficiency on calcium homeostasis and the formation of bones and teeth. The significance of gastric histidine decarboxylase in the control of gastric secretion is being studied using specific inhibitors.

The pharmacological investigation of prostaglandins has been continued in the laboratory of Professor F. A. Sunahara. This project was carried out in collaboration with Dr. Marcus Viguera and Mr. D. Kadar. In studies involving prostaglandin extraction from the kidney there was no significant difference in the prostaglandin content between the kidneys from Grollman hypertensive rats and from unilaterally nephrectomized rats, either on the basis of total prostaglandin or calculated on per kidney or kidney weight basis. Furthermore, there was no correlation between prostaglandin content and the severity of the hypertension. No further study is contemplated along this line. Studies of the mechanism of action of prostaglandin in isolated vascular tissue were pursued. In experiments based on tissues incubated in



various media containing ouabain, different electrolytes and/or vasoactive substances, there was good evidence that the action of  $\text{PGE}_1$  of the prostaglandin family requires the presence of K-Na dependent ATPase. The *in vivo* effects of prostaglandin and its interaction with autonomic drugs are being investigated on the microcirculation of the rat mesoappendix and the cremaster muscle. Using a rather novel optical-electronic system consisting of microscope, image splitting apparatus, television camera and monitor and a write-out apparatus, it was possible to monitor blood vessel dimension changes quantitatively and also determine the exact temporal relationship of drug action. Preliminary study indicates that prostaglandin at sub-cardiovascular threshold doses alters the normal norepinephrine response in the mesoappendix but not in the cremaster muscle circulation. Pharmacological responses to vasoactive drugs in these circulatory beds appear to be quite different in many respects and will require considerable study.

Professor Roschlau's research is broadly oriented towards the study of the physiology and pharmacology of blood coagulation, anticoagulation, and fibrinolysis. Specific areas of investigation at present are the liberation of vasoactive polypeptides (kinins) during states of induced fibrinolysis, and the pharmacological modification of the kinin response to systemically administered thrombolytic agents.

The fibrinolytic enzyme CA-7 is currently evaluated, and clinical trials of the enzyme as a thrombolytic agent have been organized in several treatment centres in collaboration with the Connaught Medical Research Laboratories, University of Toronto.

Professor Zsoter studied the effect of hypoxia on the response to various vasoactive drugs. With Mr. Fred Hart, he investigated the effect of thiazides and related diuretics on the veins.

In the Toronto Western Hospital the effect of morphine and meperidine on the peripheral circulation, particularly on the venous system, was studied. In association with Dr. Beanlands, the effect of propranolol on angina pectoris was investigated in double blind trial and results compared to coronary angiography.

The research in Professor Seeman's laboratory with W. O. Kwant, T. Sauks, W. Argent and S. Lu centres on the properties of biological membranes. In particular, the ultrastructure and pharmacological properties of cell membranes are under detailed study. The results bear on certain problems involved in neurophysiology and general physiology, such as the mechanism of nerve conduction, the action of tranquillizers, anaesthetics and antihistamines, the preservation of blood cells, the action of anti-inflammatory drugs (steroids) and certain vitamins, etc.

New techniques have been devised to measure very small increases in the membrane surface area brought about by various compounds. New methods are being used to measure for the first time the actual membrane concentrations of drugs. With these data it is possible to test very precisely certain theories (Pauling's, Miller's, Schneider's, Benson and King's, etc.) of the mode of action of tranquillizers, anaesthetics and alcohols. It has been determined in this laboratory, for example, with these new methods that most of these chemical compounds at their effective concentrations expand biological membranes by about 1.2 per cent in area. About one-third of this expansion can be accounted for by the volume of the molecules themselves while the remaining two-thirds represents a secondarily induced membrane expansion. The membrane-associated components, such as enzymes, antigen sites, and drug-receptor sites, may be greatly affected by this general expansion since it is known that very small changes in these components have profound effects. The molecular parameters important in inducing this expansion are being determined.

The structure and function of the normal red blood cell membrane are also being examined.

Professor P. D. Cooper has been studying giant neurons from snails as possible test objects for a variety of drugs, particularly C.N.S.-active agents. Research is also continuing on the synthesis of new drugs with potential as alkylating agents of long duration.



The activities of Professor Mahon are reported by the Department of Medicine, and those of Professor E. Llewellyn Thomas by the Institute of Biomedical Electronics.

#### HONOURS

DR. W. KALOW, Appointment to the Editorial Board, *Pharmacological Reviews*; MRC, Visiting Professorship, London, Ontario.

#### SCHOLARLY ADDRESSES

DR. COOPER addressed researchers at the Centre National de la Recherche Scientific, Paris, France, on May 8, 1968, on "Effect of Enzymes on Isolated Organs."

DR. ENDRENYI spoke on "Quantitative Analysis of Overlapping Gaussian Peaks," April 2, 1968, at the American Chemical Society 155th National Meeting, San Francisco, California.

DR. JOHNSON presented a paper on "The Influence of Orally Administered Pranylamine on the Storage and Excretion of Catecholamines in Humans and Rats" to the Toronto Clinical Investigation Society, April 1968.

DR. KALANT presented the following papers: "Interpretation of Post-Mortem Ethanol Concentrations," delivered to the Meeting of International Joint Committee on Aviation Pathology, Ottawa, September 1967; "Recent Studies on Tolerance and Dependence on Drugs Affecting the Nervous System," delivered to the Toronto Section of the Chemical Institute of Canada, November 1967; with Dr. Khanna, "Effects of Chronic Ethanol Treatment on Intermediary Metabolic Pathways," delivered to Centennial Symposium on Alcohol and Metabolism, Wayne State University, Detroit, April 12-13, 1968. He was an invited participant in "Symposium on Congeners In Alcoholic Beverages," Rutgers State University, New Brunswick, New Jersey, April 1, 1968.

On behalf of the New York Academy of Sciences and jointly with Professor B. La Du of New York University, DR. KALOW organized and chaired a Conference on Pharmacogenetics in New York from October 5-7, 1967. On problems related to Pharmacogenetics he addressed students and interested staff at the University of Western Ontario, Queen's University, New York State University at Buffalo and at Boston University. He spoke at: symposium entitled "Basic Sciences Related to Anesthesiology" at Albert Einstein College of Medicine in New York, May 1968; Ross Conference on "Problems of Drug Evaluation in Infants and Children," in Puerto Rico, May 1968; and as a member of a "Panel on Clinical Medicine and Enzymology" at the Royal College of Medicine Meeting in Toronto, January 1968.

DR. KUMAR presented papers at the Symposium on Thyrocalcitonin and the C-Cells, London, England, July 1967; and the Third International Parathyroid Conference, Mont Gabriel, Quebec, October 1967.

MRS. M-L. D. SCHÖNBAUM with DR. R. VOLPE (Department of Medicine) presented a paper entitled: "Long-Acting Thyroid Stimulator; Clinical and Experimental Studies," at the 6th Acta Endocrinologica Congress in Helsinki, Finland.

At the 9th Canadian Cold Physiology Conference, at Edmonton, Alberta, DR. G. STEINER (MRC Scholar, Department of Medicine) and DR. E. SCHÖNBAUM co-authored a paper: "Lipid Metabolism: Effects of Immunosympathectomy and Acclimation to Cold."

DR. E. SCHÖNBAUM spoke at Harbor General Hospital, Los Angeles, California, about current studies of the Toronto Thyroid Group. Recent work on immunosympathectomy and temperature regulation in this Department was described by Dr. Schönbaum at the Department of Physiological Sciences, School of Veterinary Medicine, University of California at Davis.

Addresses given by DR. SEEMAN in 1967-68 were to: The British Pharmacological Society, Nottingham, England on "The Mechanism of Anesthesia"; Columbia Uni-



versity, New York, on "Membrane Structure and Function"; The National Research Council, Ottawa, on "Recent Advances in Erythrocyte Research" and The International Symposiums on Erythrocytes and Thrombocytes, Vienna, on "Membrane Permeability."

DR. A. K. SEN spoke on "Mechanism of Ouabain Inhibition of Sodium and Potassium dependent Adenosine Triphosphatase of Guinea Pig Kidney," at the Department of Pharmacology, University of Oslo, Oslo, Norway, and Department of Physiology, University of Bangkok, Thailand.

DR. SUNAHARA presented a paper and participated in the Prostaglandin Symposium held on October 16-17, 1967, at Worcester Foundation for Experimental Biology, in Shrewsbury, Mass. The paper was entitled "Effects of Ouabain on the Interaction of Autonomic Drugs and Prostaglandin on Isolated Vascular Tissue."

#### PUBLICATIONS

- BAKKE, J. L., LAWRENCE, N. L., and SCHÖNBAUM, E. "Chronic Effects of Triiodothyronine on Thyrotrophin Levels in Thyroidectomized Rats" (*Canadian Journal of Physiology and Pharmacology*, vol. 57, no. 1, Jan. 1968, pp. 142-8).
- GIBBINS, R. J., KALANT, H., and LEBLANC, A. E. "A Technique for Accurate Measurement of Moderate Degrees of Alcohol Intoxication in Small Animals" (*Journal of Pharmacology and Experimental Therapeutics*, vol. 159, no. 1, Jan. 1968, pp. 236-42).
- GROSSMAN, M., KALOW, W., and COOPER, P. "Effects of Enzymes on the Pharmacology of Isolated Organs" (*Nature*, vol. 217, no. 5134, March 23, 1968, pp. 1151-2).
- HICKIE, R.A., and KALANT, H. "Modification of Hexobarbital Metabolism by Morris Hepatoma 5123tc" (*Canadian Journal of Physiology and Pharmacology*, vol. 45, no. 6, Nov. 1967, pp. 975-83).
- HOCKMAN, C. H., MAUCK, H. P., JR., and CHU, N-S. "ECG Changes Resulting from Cerebral Stimulation. III. Action of Diphenylhydantoin on Arrhythmias" (*American Heart Journal*, vol. 74, no. 2, Aug. 1967, pp. 256-60).
- HOCKMAN, C. H., MAUCK, H. P., JR., and HOFF, E. C. "Experimental Neurogenic Arrhythmias" (*Bulletin of the New York Academy of Medicine*, vol. 43, no. 12, Dec. 1967, pp. 1097-105).
- KADAR, D., COOPER, P. D., and SUNAHARA, F. A. "Extraction, Isolation, and some Pharmacological Characteristics of Rabbit Renal Medullary Extracts" (*Canadian Journal of Physiology and Pharmacology*, vol. 45, no. 6, Nov. 1967, pp. 1071-1080).
- KADAR, D., and SUNAHARA, F. A. "The Influence of Prostaglandin on the Effect of Autonomic Drugs in the Superior Mesenteric Vein" (*Proceedings of the Canadian Federation of Biological Societies*, vol. 10, July 1967, p. 24).
- KALANT, H. "Pathophysiological Factors in the Etiology of Alcoholism" (*Canadian Medical Association Journal*, vol. 97, no. 10, Sept. 2, 1967, pp. 1053-7).
- Invited contributor to A.M.A. Manual on Alcoholism, 1967.
- KALANT, H., and GROSE, W. "Effects of Ethanol and Pentobarbital on Release of Acetylcholine from Cerebral Cortex Slices" (*Journal of Pharmacology and Experimental Therapeutics*, vol. 158, no. 3, Dec. 1967, pp. 386-93).
- KALOW, W. "Pharmacogenetics" (*Postgraduate Medicine*, vol. 42, no. 1, July 1967, pp. 32-8).
- "Pharmacogenetics and the Predictability of Drug Responses" (*Ciba Foundation Symposium on Drug Responses in Man*, 1967, pp. 220-33).
- KHANNA, J. M., KALANT, H., and BUSTOS, G. "Effects of Chronic Intake of Ethanol on Rate of Ethanol Metabolism. II. Influence of Sex and Schedule of Ethanol Administration" (*Canadian Journal of Physiology and Pharmacology*, vol. 45, no. 5, Sept. 1967, pp. 777-85).
- MAUCK, H. P., and HOCKMAN, C. H. "CNS Mechanisms Mediating Cardiac Rate and Rhythm" (*American Heart Journal*, vol. 74, no. 1, July 1967, pp. 96-109).
- POWELL, P. E., and KUMAR, M. A. "Gastric Histidine Decarboxylase" (*Analytical Biochemistry*, vol. 22, no. 3, March 1968, pp. 485-92).
- ROSCHLAU, W. H. E. "Thrombolytic Therapy with CA-7, a Fibrinolytic Enzyme from *Aspergillus oryzae*: A Report of Two Representative Cases" (*Canadian Medical Association Journal*, vol. 98, no. 16, pp. 757-61).
- SEN, A. K., and TOBIN, T. "Ouabain Inhibition and Ligand Affinities of the (Na<sup>+</sup> + K<sup>+</sup>)-Dependent ATPase of Guinea Pig Kidney" (*11th Annual Proceedings of the Canadian Federation of Biological Societies*, vol. 2, June 1968, pp. 93-4).
- STURTRIDGE, W. C., and KUMAR, M. A. "Assay of Calcitonin in Human Plasma" (*The Lancet*, vol. 1, no. 7545, April 6, 1968, pp. 725-6).
- "Calcium Homeostasis in Chronic Thyrocalcitonin Deficiency" (*Endocrinology*, vol. 81, no. 6, Dec. 1967, 1297-1300).



- SUNAHARA, F. A., and STERNE, V. "Effects of Prostaglandins on Isolated Ureters" (*Proceedings of the Canadian Federation of Biological Societies*, vol. 10, July 1967, p. 21).
- WALTERS, G. C., and COOPER, P. "Alicyclic Analogue of Mescaline" (*Nature*, vol. 218, no. 5138, April 20, 1968, pp. 298-300).
- ZSOTÉR, T. "Effect of Aminophylline and Isoproterenol on Venous Distensibility" (*Canadian Journal of Physiology and Pharmacology*, vol. 46, no. 2, March 1968, pp. 225-8).

## PHYSIOLOGY

*Under the direction of Professor R. E. Haist*

During the past year three new members were added to the staff, increasing the strength of the Department in areas concerned with salt and water metabolism, blood volume and water regulation, renal function and the mathematical approach to biological problems. In addition to providing lecture and laboratory instruction to undergraduate students and taking an active part in the planning of the New Curriculum along with the other members of the Department, these new members have organized their research laboratories and instituted active research programmes.

In all undergraduate classes there were over two thousand students, almost eight hundred of whom were in laboratory classes. There were twenty-seven graduate students, six students proceeding to the B.Sc. (Med.) degree, and five postdoctoral fellows not enrolled for a degree but receiving advanced training. One visiting scientist from Czechoslovakia has been with us for most of the year.

Many distinguished scientists visited the Department, the following presenting lectures or seminars: Dr. Iain MacIntyre, Postgraduate Medical School, London, England; Dr. C. A. Goresky\*, Montreal General Hospital; Dr. Walton W. Shreeve, Brookhaven National Laboratory; Dr. J. J. Hoet, Université Catholique de Louvane, Belgium; Dr. Hans-Dieter Söling\*, University of Göttingen, Holland; Dr. E. M. Renkin\*, Duke University Medical Center, North Carolina; Dr. B. Pomeranz, Massachusetts Institute of Technology; Dr. B. Issekutz\*, Department of Physiology, Dalhousie University; Dr. J. H. Dirks\*, Royal Victoria Hospital, Montreal; Dr. K. Krnjevic\*, McGill University; Dr. R. M. Preshaw\*, Mayo Clinic; Dr. D. S. Kronfeld\*, School of Veterinary Medicine, University of Pennsylvania; Dr. J. S. Beck, University of Minnesota; Dr. J. Grayson, University of Alberta; Dr. J. A. F. Stevenson\*, University of Western Ontario; Sir David Cuthbertson\*, University of Glasgow; Dr. J. M. Fredrickson, Stanford University School of Medicine; Dr. N. S. Track, Guy's Hospital Medical School, London, England.

Ten of these lectures\* were given under the Visiting Lecturers Programme of the School of Graduate Studies, and in addition special lectures were given by Dr. A. K. Laws of the Department of Anaesthesia, University of Toronto, and Dr. R. O. Heimbecker of the Department of Surgery, University of Toronto.

The Department is greatly indebted to a number of honorary members who assisted in undergraduate and graduate teaching: Dr. Stanley Hartroft; Dr. Donald Fraser; Dr. Julio Martin; Dr. Langford Kidd; Dr. L. Sutherland and Dr. R. Wilson of the Research Institute of the Hospital for Sick Children; Dr. Walter Johnson of the Department of Otolaryngology, and Dr. A. T. Storey of the Faculty of Dentistry. Dr. J. Archibald has given valuable help in relation to the animal care.

The amount of time devoted to committee work in connection with curriculum changes and other matters and the paper work associated with questionnaires from various agencies has continued to require a large amount of time of many members of the staff. Despite this, the research activity of the various members of the Department has been high.

## RESEARCH

In Professor R. E. Haist's section Professor J. K. Davidson with Miss Marcia Zeigler has continued to work on investigation of insulin activity in native and acid-alcoholic treated serum and in extracts of pancreas in several physiologic and pathologic states, including prolonged fasting. Coypu and capybara insulins have been shown to be non-



neutralizable by antibodies to beef insulin and it has been shown that the coypu can produce potent immune serum when injected with beef insulin. With Professor A. M. Rappaport, studies have been conducted in dogs on the effect of glucose, adrenaline and growth hormone administration on the output of insulin by an isolated portion of the pancreas. With Mrs. Judith Coddling the studies on the degradation of standard insulin in the presence of various proteins and serum components have been carried out and with Professor M. A. Ashworth, studies on the insulin changes in the depancreatized animal have been undertaken. Dr. B. J. Lin with Miss W. B. Asico has been studying the synthesis of proinsulin and of insulin in isolated islets by following the incorporation of tritiated leucine into the molecules. The way the synthesis can be modified by the presence of certain substrates or agents which affect the energy supply is being followed. Professor M. A. Ashworth with Miss S. Macdonald Doyle has been developing a new procedure for the estimation of islet volume in the pancreases of larger animals. Dr. M. Vigas, visiting scientist from Bratislava, Czechoslovakia, has been studying the insulin-response of the islets in hemorrhagic shock.

In Professor J. Campbell's section, effects of growth hormone on insulin secretion and utilization and on metabolism have been investigated with Dr. K. S. Rastogi, Mr. G. R. Green and Mrs. V. Lazdins. It was found that growth hormone treatment increased both the rate of utilization and the rate of secretion of insulin. Coincident effects on carbohydrate and lipid metabolism were studied. In co-operation with Professor Hetenyi, the effects of adrenalectomy on serum and pancreatic insulin and the responses of dogs to growth hormone and glucocorticoids were followed. Dr. Y. Tasaka devised a method for determination of insulin release from pancreatic tissue *in vitro* using an inhibitor of insulinase. Mr. M. Nijjar has continued this work. Dr. J. Pierluissi studied insulin destruction and utilization by muscle tissue *in vitro* in relation to metabolic activity.

In Professor A. M. Rappaport's section, research has continued on the effects of hepatic arterial ischemia as compared to portal venous ischemia on survival and metabolism of partially or totally depancreatized dogs. This has been done together with Dr. T. Kawamura, Mr. J. S. Cowan and Professor J. Campbell. Portal venous ischemia does not prolong survival of the depancreatized dog. Work has continued with other groups in the Department on factors determining the measured insulin output of the blood flow in an isolated portion of the pancreas.

Professor J. W. Pearce, and Professor H. Sonnenberg, both of whom came to the Department this year, have been examining the role of renal nerves in the compensation for increased blood volume by the kidney and have been studying the effects on this kidney response of altered renin content of the kidney and of the blood. They have instituted a collaborative research programme concerned with a study of the mechanisms of kidney response to altered body fluid volume, a function which is disturbed in heart disease.

Professor F. C. Monkhouse, with Mrs. Susan Milojevic, Miss Lorna Brennan and Mr. David Purdon, has continued to study the physiological function of antithrombin. Studies on purification have been extended to human plasma. In collaboration with Dr. R. MacMillan of the Department of Medicine, antithrombin and heparin cofactor activities of the plasma and serum of coronary patients have been measured. With Miss Anne Hedlin, Mr. M. A. Rompila and Miss Adrienne Schmitt, experiments are in progress to study the effectiveness of heparin and other drugs as activators of the fibrinolytic system. Studies are also being made on the effect of high fat diet on the inhibition and activation of the fibrinolytic system. Relationship between antithrombin activity and antifibrinolysin activity of plasma is under investigation.

In Professor G. Hetenyi's section a new method for the determination of turnover of metabolites has been worked out in collaboration with Mr. J. W. Cowan. This method is now being used to establish the transfer function of the system regulating glucose homeostasis in dogs. With Mr. J. D. Hall and Dr. N. F. Forbath, the effects of adrenocortical stimulation on the turnover of lactic acid and lactate-glucose



cycle in dogs has been investigated. Adrenocortical steroids and ACTH markedly increase lactate turnover without a preferential conversion of lactate to glucose. The effect of infusion of various sugars on the turnover of glucose and the role of insulin release in this effect were studied with Dr. K. Ishiwata. Glucose alone was found to decrease the rate of hepatic glucose production independently of the release of insulin. The physical characteristics of the penetration of glucose across the liver cell membrane are being studied in collaboration with Mr. K. H. Norwich and Mr. D. R. Studney. A new apparatus recording and displaying continuously the activity of beta-emitting isotopes in the tissues of living animals is being developed in collaboration with the AEC (Chalk River).

In Professor J. W. Scott's section Dr. James Love has continued his studies of activity of neurons in the geniculate body and the effects of auditory stimulation. Mr. David Johnson has been studying the production of nystagmus by stimulating the semicircular canals electrically.

In the sections of Professors Otakar and Anna Sirek experimental work on dogs deficient in certain endocrine functions was carried out along two main lines. In collaboration with Drs. Atsushi and Hatsumi Niki, visiting scientists from the University of Nagoya, Japan, the acute effects of a single injection of growth hormone on plasma free fatty acids and amino acids were studied. The results indicate that the initial reduction in the concentration of free fatty acids which follows a single injection of growth hormone is not dependent on the action of insulin and can be abolished by dihydroergotamine administration. The reduction in plasma amino acid level is linked to protein synthesis in the presence of adequate insulin levels, but in the diabetic animal is related to gluconeogenesis. The effects of related hormones such as prolactin and placental lactogen are being carried out by Mr. K. Chan. In this section, too, a study of the distribution of glycosaminoglycans in aortic and dermal tissues of endocrinologically deficient animals is being conducted by Dr. H. F. MacKay and Miss Margaret Loughney. A micro-method for the determination of hyaluronic acid and sulfated glucose amino and galactose amino glycans was developed.

Professor Margaret Henderson Santalo continued the studies of the relationship between the distribution of glucose in rat liver and the hypoglycaemia produced by either insulin or phlorizin. The hypoglycaemia produced by insulin and to a lesser degree by phlorizin was accompanied by an increase in the glucose space of the liver. It was found that adrenaline caused an increase in glucose space and in hepatic glycogen. The effect of adrenergic blocking agents was investigated also and studies of the role of endogenous glucagon release in response to the hypoglycaemia has begun.

Professor J. Hunter has been studying the possible relationship between cation transport and hypertension. With Dr. Lin he has shown the effect of hypothermia on the blood insulin response to glucose.

In Professor M. Vranic's section, work with simulated rates of insulin secretion has continued and tracer-determined metabolic clearance of glucose was used to assess the simulated rate since the inhibition of endogenous glucose production did not correlate with insulin increments. With Mr. P. Fono and Mrs. N. Kovacevic it was demonstrated that such dogs are near dynamic steady state when fasted and when challenged with a glucose impulse. With Dr. B. Lin the insulin of plasma was followed. Studies during exercise were performed with Dr. G. A. Wrenshall and during ribose infusion with Drs. Hetenyi and Ishiwata. In collaboration with Dr. M. Albisser and Mr. J. S. Cowan the interplay between insulin and glucagon is being investigated.

In Professor L. W. Organ's section, work has been carried out on electrocardiography in the normal human fetus during labour and has continued on measurement of brain tissue impedance in cats and human subjects during stereotaxic surgery. Studies have begun on recording of unit action potentials from the cat somatosensory thalamus.



Professor D. R. Crapper, with the assistance of Mr. M. Skopitz, is studying the effect of neurotubular proliferation on the electrical properties of neurones by intracellular techniques.

Professor R. Ninomiya has been carrying out investigations on basic problems concerning the validity of tracer determined transfer rates in the presence of recycling of tracer material. He has studied the relationship between the fractional turnover rate of glucose in the fasting state and the decay constant  $K$  of the glucose tolerance curve after a glucose load in various species. He has been determining the usefulness of the proposed simulation equations for computing the rate of glucose infusion at varying speeds and developing a theory for computing the rate of intestinal absorption of glucose from the data obtained from the double tracer experiment.

#### SCHOLARLY ADDRESSES

D. R. CRAPPER, "Neurofibrillary Tangles and Altered Electrical Activity of the Brain," Royal College of Physicians and Surgeons, Toronto, January 1968; "Dementia: An Experimental Approach," McMaster University, Department of Psychiatry, February 1968; Visiting Professor in Neurophysiology, University of Buffalo, March 1968.

G. HETENYI, JR., "Mechanisms in Glucose Homeostasis," McGill University, Montreal, February 1968; "The Liver, Insulin and the Homeostasis of Glucose," University of Manitoba, Winnipeg, March 1968.

J. M. MARTIN, "Effect of Adrenaline and 3'5'-cyclic AMP on Insulin Secretion," 6th congress, International Diabetes Federation, Stockholm; "Regulation of Insulin Secretion," Workshop on Diabetes, Montebello, Quebec; "Immunoassay of Insulin," as a member of the panel on "Immunoassay of Peptide Hormones," Canadian Society for Clinical Investigation, Toronto.

R. NINOMIYA, "Metabolic Control of Glucose Homeostasis," invited lecture at the symposium "Progress in Diabetic Research" held by Japan Diabetic Society.

J. W. PEARCE, "Renal Nervous and Spinal Pathways and the Reflex Regulation of Extracellular Fluid Volume," contribution to symposium on Neural Regulation of Body Fluids, American Physiological Society Meeting, Washington, D.C., August 1967; "The Natriuresis of Blood Volume Expansion," seminar given to Department of Physiology, Université de Montréal, March 1968.

A. M. RAPPAPORT, "Pathways of Normal Microcirculation in the Mammalian Liver: Microcirculation in the Liver of Choline Deficient Mice Drinking Alcohol" (illustrated with color film), 31st Congress and Festival International Scientific Film Association, Montreal, September 1967; "Experimental Veno-occlusive Disease," American Association Study of Liver Disease, Chicago, November 1967; "Experimental Hepatic Veno-occlusive Disease," Ontario Association of Pathologists, Canada Centennial Meeting, Ottawa, November 1967; "Normal and Pathologic Gross- and Micro-circulation of the Liver" (illustrated by a film on hepatic microcirculation); "Cine-veinographie hépatique et renale," at the IXth Argentinian Congress of Gastroenterology, Mar del Plata, Argentina, December 1967; "Normal and Pathologic Circulation of the Liver," at the Medical Society of La Plata, December 1967; "Normal and Pathologic Micro-circulation of the Liver," at the Department of Internal Medicine, Medical School, University of Buenos Aires, December 1967; "Quantitative Determination of Insulin Output, Following an Intravenous Glucose Tolerance Test in the Dog," at the Clinica de las Enfermedades del Aparato Digestiva, December 1967.

A. SIREK, "Plasma Free Fatty Acids Concentrations in Houssay Dogs Following a Single Injection of Growth Hormone," 6th Congress of the International Diabetes Association (Stockholm).

O. V. SIREK, "The Effect of Growth Hormone on Plasma Concentration of Free Amino Acids in Diabetic Dogs," 6th Congress of the International Diabetes Federation (Stockholm); "Combined Effects of Growth Hormone and Serotonin



on Plasma Amino Acids in Dogs," at the Federation of American Societies for Experimental Biology in Atlantic City; "Metabolic Studies in Houssay Dogs," The Endocrine Society of the University of Heidelberg (Germany).

G. STEINER, "Post-heparin and Lipolytic Activity in Fat Induced Hyperlipemia," to the Eastern Section of the American Federation for Clinical Research; "Effects of Immunosympathectomy on the Metabolic Response of Adipose Tissue and Liver to Cold Acclimation," to the Federation of American Society for Experimental Biology; "Effects of Cold Acclimation and Immunosympathectomy on Lipid Metabolism," given to the Canada Cold Physiology Meeting, Edmonton, November 1967.

M. VRANIC, "Matched Rates of Insulin Infusion and Secretion and Concurrent Tracer Determined Rates of Glucose Appearance and Disappearance in Fasting Dogs," Sixth International Diabetes Congress, Stockholm, August 1967; "Tracer Determined Turnover Rates of Glucose as Related to Temporary Diabetes and Insulin Secretion," to the Department of Physiology, Medical Faculty, University of Zagreb, Yugoslavia, September 1967.

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## PSYCHIATRY

*Under the direction of Professor R. C. A. Hunter*

The academic year 1967-1968 has witnessed the further evolution of the Department of Psychiatry and its several facilities. New and increased expectations arising from the University, the scientific community and the community-at-large have exerted their influence and have led to an expansion and diversification within the University psychiatric network. Necessary revisions, following hard upon the opening of the Clarke Institute of Psychiatry during the previous academic year, have conferred upon the Department a lively and eventful character. Changes have been so numerous that only the more important ones can be mentioned in this report.

### CLARKE INSTITUTE OF PSYCHIATRY

The policies and aspirations of the several services of the Institute mentioned in last year's report continue to progress. During the current year important developments have included the addition of a psychiatric service to the Juvenile and Family Court of Metropolitan Toronto and the visit of the Canadian Council on Hospital Accreditation. Utilization of the Institute's clinical facilities has increased significantly, as has the teaching function, not only to medical personnel but to a variety of ancillary professional groups. Professor Oleh Hornykiewicz, appointed jointly with the Depart-



ment of Pharmacology, has instituted a research section on pharmacological studies of the central nervous system. Another joint appointment, that of Professor N. W. Bell, with the Department of Sociology, has appreciably strengthened the Institute's resources in the areas of sociological research, teaching and consultation.

#### GENERAL HOSPITALS

The academic and clinical contributions of psychiatry within the teaching general hospitals were considerably increased by the setting up of separate departments of psychiatry. This was carried out by mutual agreement between the University and each of the general hospitals.

The following appointments were made: Sunnybrook Hospital, Dr. W. E. Boothroyd, Psychiatrist-in-Chief; New Mount Sinai Hospital, Dr. S. Greben, Psychiatrist-in-Chief; Wellesley Hospital, Dr. I. Hector, Psychiatrist-in-Chief; Women's College Hospital, Dr. L. Plumb, Psychiatrist-in-Chief; Toronto General Hospital, Dr. R. Pos, Psychiatrist-in-Chief (effective July 1, 1968); Toronto Western Hospital, Dr. A. J. Preston, Psychiatrist-in-Chief; St. Michael's Hospital, Dr. W. J. Stauble, Psychiatrist-in-Chief (effective July 1, 1968).

In order to ensure mutual consultation, a Planning Committee was set up to meet once monthly. This Committee is composed of the Chiefs of all the psychiatric units within the University network, as well as departmental representatives from education, research and administration, and is under the chairmanship of Professor R. C. A. Hunter.

This Committee, which replaces in part the Board of Teachers, has already proved its worth as a clearing house for information and as a device for planning, policy-making and integrating the educational, research and service functions of the teaching psychiatric facilities.

#### CHILDREN'S FACILITIES

Dr. Quentin Rae-Grant has been appointed Professor of Child Psychiatry and Psychiatrist-in-Chief of the Hospital for Sick Children, effective July 1, 1968. This appointment not only formalizes the establishment of a separate Department of Psychiatry in this important Hospital but opens the way for further development and integration of the teaching, research and service functions of the psychiatric facilities for children.

Dr. John Fotheringham has been appointed Medical Director of the Mental Retardation Centre.

A most significant development was the opening of the new Hincks Treatment Centre for adolescents, under the direction of Dr. A. M. Hood. This modern and well-staffed facility has begun to contribute substantially in the area of adolescent psychiatry.

#### MENTAL HOSPITALS

Plans for the reorganization of the Ontario Hospital, Toronto, were announced by Dr. P. A. Christie, Superintendent. The hospital has changed its name to the Queen Street Mental Health Centre and has revised its policies so that it can evolve more clearly in the direction of a community mental health centre and active treatment service.

Twenty-two former postgraduate physicians were successful in the Certification examinations of the Royal College of Physicians and Surgeons of Canada – one was awarded a Fellowship.

Throughout the academic year, a number of distinguished psychiatrists have visited from abroad to deliver lectures and conduct seminars. These included Dr. Jules H. Masserman, Professor and Chairman, Department of Psychiatry, Northwestern University, Illinois; Dr. Ian Gregory, Professor and Chairman, Department



of Psychiatry, Ohio State University; and Dr. Lawrence Kolb, Professor of Psychiatry, College of Physicians and Surgeons, Columbia University, New York.

A seminar in Child and Adolescent Psychiatry and a postgraduate course in Mental Retardation, sponsored by the Division of Postgraduate Medical Education, were held at the Department of Psychiatry in November 1967 and April 1968.

Dr. N. W. Bell arranged a series of films on "Family Therapy" and a panel discussion in March 1968.

During the fall of 1967, the first Clarke Institute publication "Psychiatry in Transition", edited by Dr. Aldwyn B. Stokes, was published.

On July 1, 1967, Professor R. C. A. Hunter, succeeded Professor A. B. Stokes as Chairman of the Department and Psychiatrist-in-Chief of the Clarke Institute of Psychiatry.

#### RESEARCH

*Reported by Professor J. W. Lovett Doust*

The past twelve months represent the first complete year of work at the Clarke Institute of Psychiatry. A great deal of research endeavour has burgeoned during this time and space dictates only an earnest of the whole.

In the Section of Community Studies, Dr. D. B. Coates has supervised a series of social fact-finding surveys of the population of the Borough of East York. These have included a demographic analysis by M. Gillies, studies of industry and real estate by J. Edge, and of mobility and the characteristics of a high-rise community by C. Nichols. M. Etkin surveyed the available health and social agencies. A large scale household survey is contemplated as an attempt to measure "mental health" and collaboration with Professor N. W. Bell and others of the Department of Sociology will enable study of family structure and dynamics in the same population to be correlated with this survey. The overall programme is further aided by the clinical facilities afforded by Dr. S. Freeman and his Service B. The research aspects of this Service have included data collection and the development of experimental programmes for measuring the effects of a community network on patient referral, service and follow-up, and on members of the helping professions.

In the Section of Psychology research, Dr. B. Quarrington has continued his enquiries into the onset of stuttering in young children. The roles of parental attitude and goal-setting behaviour and that of a parent-child interaction have been explored. Dr. Quarrington has collaborated in several other researches. One of these has been with Dr. J. Fotheringham of the Toronto Mental Retardation Centre on the dimensional analyses of family functioning. On the Child and Adolescent Service, the Stott revision of the Oseretzki Scale has been employed in an attempt to seek some correlates of motor deficits in young children.

In the Section of Social Pathology Dr. J. W. Mohr has completed his five-year follow-up studies on sexual offenders and A. Gigeroff has finished his book on *Sexual Deviation in the Criminal Law*. Matricide and an investigation of the victims of sexual offences are under current review. With Dr. K. G. Gray and Dr. R. E. Turner nearly 600 sex offender cases have been studied. In England on a travelling fellowship, C. Greenland conducted a study of the mental health review tribunals established in 1959.

In the Section on Neurochemistry Dr. H. Stancer and Dr. P. Sastry completed their analytical study of blood lipids in schizophrenia, and of blood and cerebrospinal fluid lipids in healthy controls and patients with mental retardation. With Mrs. Czarnocki they have determined the lipid composition of human, sheep and bovine pineal glands and compared these with a number of other tissues to evaluate the role of lipids in the structure and function of this gland. It was found that pineals resemble testes in phospholipid composition. The metabolic significance of this finding is now under study with isotopes. Dr. Sastry and Mrs. Cummings are investigating the metabolism of plasmalogens in rat brain during active myelination. In the clinical



investigation unit, Dr. Stancer has continued his investigation of lithium as a prophylactic agent against recurrent depressions. Preliminary findings indicate a partial rather than a total therapeutic effect. Dr. H. Moldofsky has carried out investigations on multiple tic syndromes as they relate to physiological events. He is also devising a behavioural rating scale for occupational therapy with the assistance of Mrs. D. Little. With Dr. Godse in the metabolic laboratory the biochemical events associated with lithium treatment or with a 48 to 72 hour affective psychosis are being studied. The method for continuous analysis of cholesterol *in vivo* has also been modified and extended.

In the Section of Psychophysiology Dr. J. W. Lovett Doust has been attempting to characterize psychiatric patients by their physiologic status. Correlation of brain potentials, electro-oculograms and various dimensions of cerebral blood flow measurements have been made under conditions of rest and various stresses. With I. Podnieks, studies have been made of attention and other vigilance factors. Clinical facilities on Research Unit 7 have enabled intensive psychophysiological investigations of recurrent affective and schizophreniform syndromes and of the effects of anti-aggression drugs. In the EEG department of the Hospital, Dr. J. E. Goodwin has inaugurated on-line frequency spectrum analysis of brain potentials using the Institute's Linc-8 computer. The results show a degree of accuracy quite impossible with the unaided eye.

Leaving the Clarke Institute of Toronto, Toronto General Hospital's lively Department provided both clinical and basic research activity through the year. Dr. V. J. Butler experimented with the behavioural modification of homosexuals and with the indications for lithium in affective disorders. Dr. E. Rzadki has developed stereotactic techniques for depth electrode implantation in cats and continued his studies on the neurophysiology of the Limbic system. Dr. J. Jamieson has been testing some hypotheses regarding reciprocal inhibition therapy for psychoneurotics. Dr. R. Pos has continued his studies of perceptual deprivation. With D. Seeley he has developed a power density spectral analysis of EEG and with D. Jackson he has studied the resting and evoked potentials of a group of autistic children. Other studies supervised by Dr. Pos include the effects of LSD, the electrophysiology of sleep and dreams and, with Dr. H. Shanks, the development of a special mask for cats enabling manipulation of auditory and visual input.

In the New Mount Sinai Hospital, Dr. G. Baker has been attempting to elucidate the biochemical mechanism of action of phenothiazines. He has demonstrated that the lag phase of growth of lactobacillus is inhibited by chlorpromazine. Dr. G. Boujoff has made a personality study of unwed mothers and has begun psychosomatic enquiries on low back pain and the effects of coronary infarction.

At the Wellesley Hospital, Dr. I. Hector investigated the tryptophane treatment of depression and a behaviour therapy programme for patients with obesity. With Dr. B. Robson, he made a clinical study of repeated suicide attempts. Dr. A. J. Walters continued his enquiries concerning psychogenic regional pain.

At Toronto Western Hospital, Dr. A. J. Preston made a longitudinal study of medical students' attitudes. Dr. E. Baker continued his clinical physiological investigation of patients with affective disorders, and his follow-up series of lobotomized patients. He carried out a controlled study of LSD effects with Dr. L. P. Solursh. Dr. Solursh has also attempted EEG conditioning in cases of obsessional neurosis.

At St. Michael's Hospital, Dr. A. L. Woods has been surveying his Department's out-patients for later data processing analysis. One subsample, that of downward-drift derelicts, represents a pressing social need for more information.

In Thistletown Hospital, Dr. H. Alderton has completed his studies of the Children's Pathology Index and has made a third replication of the effects of imipramine on childhood nocturnal enuresis. Dr. H. G. Greenbaum, along with Dr. W. A. Hawke and Dr. M. Havelkova of the Hospital for Sick Children, have undertaken an investigation of the clinical effects of Nicotinamide on the course of childhood schizophrenia.



At Queen Street Mental Health Centre (formerly, Ontario Hospital, Toronto) Dr. D. N. Anderson and Dr. J. Dukzsta have collaborated with a large clinical team in introducing democratic power-sharing programmes on an admission ward of the Hospital. An experimental ward has been compared with two control wards by a number of novel measurement techniques. In the research laboratories and metabolic ward, Dr. B. A. Cookson has studied steroid excretion in patients with periodic catatonia using gas liquid chromatography. With L. Huszka, he has investigated the effects of psychotropic drugs on the circadian rhythms of electrolyte excretion and adrenal function in patients with affective disorder. Dr. J. W. Lovett Doust and J. Mourant have studied the use of vasodilating drugs to improve cerebral circulation in patients with dementia.

#### HONOURS

*Centennial Medal*: DR. J. D. ATCHESON; DR. J. G. DEWAN; DR. B. H. MCNEEL; DR. C. A. ROBERTS; DR. A. B. STOKES.

DR. J. D. ATCHESON, Honorary Life Member of Child Care Workers Association.

DR. W. E. BOOTHROYD, Member of the Bishops Commission on Healing Ministry.

DR. G. P. BRAWLEY, awarded the McLaughlin Fellowship for study abroad.

MR. E. A. DOUGLASS, appointed a Research affiliate of the Massachusetts Institute of Technology.

DR. M. A. FISCHER, elected President, Ontario Group Psychotherapy Association.

DR. D. M. FORMAN, appointed Chairman of the Advisory Committee of Professional Training for the Prevention of Blindness; E. A. Baker Foundation, July 1967; Member of the Executive Committee, Canadian Arthritis and Rheumatism Society, Ontario Division; Chairman for Workers for the Blind (National meeting to be held in Toronto, 1968).

DR. K. G. GRAY, Member of Honorary Council of the Association of Occupational Therapists; Honorary Counsel, Canadian Psychiatric Association.

MR. C. GREENLAND, elected Fellow of the Royal Society of Medicine, London, 1967.

PROFESSOR R. C. A. HUNTER, Member of the Committee on Education, American Psychiatric Association; Member of the Committee on Research, American Academy of Psychoanalysis; Member of the Committee on Psychiatry, Royal College of Physicians and Surgeons of Canada; Chairman, Committee on Education, Canadian Psychiatric Association; Member Planning Commission on Education, Inter-American Council of Psychiatric Associations; Member Canadian Committee, Inter-American Council of Psychiatric Associations.

DR. J. W. MOHR, elected to National Committee, Canadian Corrections Association.

DR. A. PARKIN, elected Chairman, Canadian Institute of Psychoanalysis (Ontario); Councillor, Canadian Psychoanalytic Society.

DR. R. POS, invited to become the Founding Chairman of the Toronto Chapter of the American Society of Cybernetics.

DR. B. QUARRINGTON, President, Ontario Psychological Association.

DR. R. LINDENFIELD, elected to the National Board of the Canadian Association of Social Workers; invited to be a member of the President's Centennial Committee of the Canadian Association of Social Workers.

DR. B. QUARRINGTON, President, Ontario Psychological Association.

DR. W. J. STAUBLE, Vice-President, Ontario Group Psychotherapy Association; Secretary-Treasurer, Canadian Psychoanalytic Society (Ontario); invited to attend meeting of Pan American Health Organization, Lima, Peru, December 1967; participated in seminar on "Psychiatric and Medical Health Education in Medical Schools."

DR. R. E. TURNER, Consultant to Province of Saskatchewan and Department of Psychiatry, University of Saskatchewan, in reference to development of forensic psychiatric services; Consultant to Alberta Mental Health Study.



DR. V. J. BUTLER, served as a member of Council, Ontario Psychiatric Association; Secretary of the Psychotherapy Section of the Ontario Psychiatric Association.

DR. W. J. STAUBLE, appointed Corresponding Member of the Specialty Committee in Psychiatry of the Royal College of Physicians and Surgeons of Canada.

#### SCHOLARLY ADDRESSES

DR. D. B. COATES, "The Estimation of Illness Prevalence in the Community," The Royal College of Physicians and Surgeons of Canada Meeting, Toronto, January 1968.

DR. B. A. COOKSON, "Catatonic Illnesses," The Royal College of Physicians and Surgeons of Canada meeting, Toronto, January 1968; "Mood and Menses," Academy of Medicine, February 1968.

DR. D. H. FRAYN, "The Therapist as a Crucial Variable in Psychotherapy," Institute of Living, Hartford, Connecticut, May 1968; "Attitudes of Final Year Clinical Clerks towards Psychiatry" (presented in association with J. R. Graham, M.D.), Canadian Psychiatric Association Meeting, Regina, 1968.

DR. S. J. J. FREEMAN, "The Development of a Programme of Community Psychiatry in a Canadian Metropolitan Borough," 58th Annual Meeting of the Canadian Public Health Association, joint meeting with the Ontario Public Health Association, Ottawa, 1967.

DR. H. GOLOMBEK, "The Therapeutic Contract with the Adolescent," Annual Meeting of the Ontario Psychiatric Association, February 1968.

PROF. K. G. GRAY, "Traumatic Neurosis: Psychiatric Problems," The Royal College of Physicians and Surgeons of Canada Meeting, Toronto, January 1968; "Legal Problems and Procedures in Medical Practice," Dalhousie University, Halifax, March 1968.

DR. S. J. HOLMES, "Therapeutic Communication with People Suffering from Drug Dependency," Alex G. Brown Memorial Clinic Fifth Annual Conference on Addiction and Sexual Deviation (sponsored by the Department of Reform Institutions), May 1968.

PROF. R. C. A. HUNTER, "Factors in the Etiology of the Neuroses," Maritime Psychiatric Association, October 1967; "Psychiatry in Clinical Practice," Chairman, Teaching Symposia, The Royal College of Physicians and Surgeons of Canada Meeting, Toronto, 1968 (participants listed separately); "The Ideal Residency Training Programme in Psychiatry," Quebec Psychiatric Association, Montreal, May 1968; "The Psychiatrist as a Public Educator," (Homer McCuaig Lecture), Queen's University, Kingston, May 1968.

PROF. J. W. LOVETT DOUST, "Some New Psychotropic Drugs and Their Psychiatric Indications," The Royal College of Physicians and Surgeons of Canada Meeting, Toronto, January 1968.

DR. E. R. MARKSON, "A Case of Impaired Mourning," Canadian Psychoanalytic Society (Ontario), May 1968.

DR. J. W. MOHR, "Pedophilia and Exhibitionism," Maryland Association of Judges of the Court of Limited Jurisdiction, Maryland, May 1968; "A Research Approach to Sexual Deviance," Department of Psychiatry, University of Maryland, May 1968; "Phenomenology of Sexual Behaviour," Sheppard and Enoch Pratt Hospital, Towson, Maryland, May 1968; "Sexual Offenders - What Treatment Possibilities?", (Panel), American Psychiatric Association Annual Meeting, Boston, May 1968.

DR. H. MOLDOFSKY, "Emotional Issues in Rheumatoid Arthritis," The Royal College of Physicians and Surgeons of Canada Meeting, Toronto, January 1968.

DR. R. POS, "The Use of LSD in Psychotherapy," McMaster University, Hamilton.

DR. C. A. ROBERTS, "Mental Health and Psychiatric Consultation," Queen's University, Kingston, April 1968.

DR. E. J. ROSEN, "Behavioural and Emotional Disturbances Related to Cerebral Dysfunction," Annual Meeting of the Ontario Psychiatric Association, February 1968.

DR. R. E. TURNER, "Forensic Psychiatric Services," Annual Meeting, John



Howard Society of Alberta, Red Deer, October 1967; "Forensic Service, Clarke Institute of Psychiatry," Address before the Judges of Courts of Lower Jurisdiction and Circuit Court Judges, Maryland, May 1968; "Research in Sexual Deviation and Forensic Psychiatry," Psychiatric Institute, University of Maryland, Baltimore, May 1968; "Study and Treatment of Sexual Deviates," The Sheppard and Enoch Pratt Hospital, Towson, Maryland, May 1968.

DR. TAYLOR STATTON, "Adolescent Process," Ontario Psychiatric Association, February 1968; "Effect of Object Loss and Unsuccessful Mourning on Adolescent Development," Ontario Psychoanalytic Society, November 1967.

PROF. A. B. STOKES, "Mental Health and Psychiatric Disorder," First Hoffman-La Roche Lecture, University of Dalhousie, Halifax, March 1968.

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- BAKER, E. F. W. "The LSD Experience" (*Addictions*, vol. 14, no. 3, fall 1967, pp. 20-4).
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- BRAWLEY, P., and POS, R. "The Informational Underload (Sensory Deprivation) Model in Contemporary Psychiatry" (*Canadian Psychiatric Association Journal*, vol. 12, no. 2, April 1967, pp. 105-24).
- BUTLER, V. J. "Collaboration between Psychologists and Psychiatrists in Psychotherapy" (*Canadian Psychiatric Association Journal*, vol. 12, no. 1, Feb. 1967, pp. 66-9).
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- CAPPON, D. "A Note on Body Movement during Understimulation" (*Canadian Psychiatric Association Journal*, vol. 12, no. 1, Feb. 1967, pp. 76-7).
- "Psychiatry Tomorrow" (*American Journal of Psychiatry*, vol. 123, no. 10, April 1967, pp. 1200-1).
- "Understanding Homosexuality" (*Postgraduate Medicine*, vol. 42, no. 4, Oct. 1967, pp. 131-6).
- CAPPON, D. (with BANKS, R.) "Improvement of Recognition on a Multi-model Pattern Discrimination Test" (*Perceptual and Motor Skills*, vol. 26, 1968, pp. 431-41).
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- COATES, D. B. "Epidemiological Aspects of Community Psychiatry" (*Canadian Journal of Public Health*, vol. 59, no. 2, Feb. 1968, pp. 49-53).
- "Poverty and Mental Health" (*Canada's Mental Health*, vol. 15, nos. 5 and 6, Sept.-Oct. 1967, pp. 3-8).
- COATES, D. B. (with MALLINSON, T. J.) "Family Interaction in Schizophrenia" (*Canadian Psychiatric Association Journal*, vol. 12, no. 4, Aug. 1967, pp. 387-402).
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## RADIOLOGY

*Under the direction of Professor R. Brian Holmes*

During the past year, the Department continued to study carefully its role in the development of the new undergraduate curriculum in respect of each of the periods, and in respect to educational requirements of various types. It is hoped that the present deficiency of teaching both Diagnostic and Therapeutic Radiology can be corrected, and, included in the latter, the presentation to the students of the broad spectrum of oncology. Recent indications would suggest that the students feel they are underexposed to radiology during their undergraduate period, and that they themselves feel the need for more.

Further development and refinement of the postgraduate training programme is being instituted and a review of the changes recently initiated would show that these have resulted in an improvement in quality of the training programme. The numbers of students involved in the Diploma Courses, both Diagnostic and Therapeutic, continues to increase.



The Department, for the first time in its history, sponsored a refresher course with the help of the Division of Postgraduate Medicine. The impression was gained that this was well received by those attending, and the Department is encouraged to continue with this programme.

During the past year, the Department has begun work on organization of a training programme in mammography for practising radiologists and radiological technicians. This is to be centred at the Toronto Western Hospital and will operate with the co-operation of the Department at other hospitals. Dr. D. V. McFarlane of the Toronto Western Hospital has been named as Project Director. It is hoped that this programme will be ready to receive its first students in the fall of 1968.

Dr. B. J. Reilly has been appointed as Radiologist-in-Chief at The Hospital For Sick Children and Dr. David Rideout as Diagnostic Radiologist-in-Chief at The Princess Margaret Hospital. Dr. B. J. Shapiro, Radiologist-in-Chief at The New Mount Sinai Hospital, was appointed to the University Faculty. That Hospital Department thus becomes an integral part of the University training programme in radiology.

During the year, the Department of Diagnostic Radiology was honoured by visits from the following distinguished radiologists: Dr. Paul Roy, University of Montreal; Dr. Thomas F. Meaney, Cleveland Clinic; Dr. Shura Holesh, Westminster Hospital, London, England; Dr. Osamu Ishida, Osaka University Hospital, Japan; Dr. Sidney W. Nelson, Ohio State University; Dr. E. A. MacLaughlin, Memorial University Newfoundland; Dr. N. Snijder, Geldrop (Eindhoven, Holland); Dr. S. Oksanen, Helsinki, Finland; Dr. E. Tahti, Neilahti Hospital, Helsinki; Professor Kurt Decker, University of Munich; Dr. Fred Silverman, University of Cinn.; Dr. J. S. Dunbar (Visiting Professor), McGill University.

The following specifically visited the Ontario Cancer Institute during the year: Dr. Nadejda Greigorieva, President, USSR Medical Union, Moscow, USSR; Dr. Natalia Vorobieva, Secretary, USSR Medical Union, Moscow, USSR; Dr. Ernst Gottinger, Linz, Austria; Captain Khin Maung Ky, Burma; Dr. W. Urquhart, Palmerston North Hospital, New Zealand; Dr. H. W. J. Fox, Christchurch Hospital, New Zealand; H. R. H. Princess Margaret; The Earl of Snowdon; Dr. Simon Kramer, Jefferson Medical Center, Philadelphia, U.S.A.; Dr. V. P. Collins, Houston, Texas, U.S.A.; Dr. John Hayward, Guys Hospital, London, England; Dr. M. Bulbrook, Imperial Cancer Research Foundation, London, England; Dr. John C. Pugh, Institute of Urology, London, England; Dr. Sigvard Kaae, The Radium Center, Aarhus, Denmark; Dr. J. S. Pearson, Royal Infirmary, Edinburgh, Scotland; Dr. W. F. White, Westminster Hospital, London, England; Dr. Philip Corlette, Sydney, N.S.W., Australia; Dr. G. G. Germann, Cancer Institute, Melbourne, Australia; Dr. Jean-Pierre Wolff, Institut Gustave Roussy-Villejuif, Seine, France; Dr. P. Thomas, University Hospital, Leiden, Holland; Dr. Graham Sopsford, Royal Brisbane Hospital, Australia.

#### RESEARCH

Dr. John Campbell has completed his research on renal osteodystrophy before and after renal homotransplantation. He is also pursuing study of a long term follow-up of structure and function in the kidney in hydronephrosis.

Dr. R. F. Colapinto, along with Drs. N. D. McPhedran and R. Holiday, Department of Surgery, and Dr. B. B. Hobbs, Department of Radiology, is studying strangulating bowel obstruction in dogs by means of serial superior mesenteric arteriograms.

Dr. J. W. Davidson is carrying out studies on: (1) the role of lymphography in clinical staging of malignant lymphomas; (2) comparison of ultra-fluid Lipiodol with and without 0.87 per cent Chlorophyll; (3) the effects of radiotherapy on the response of the lung to intravascular ultrafluid Lipiodol; and (4) radiographic parameters of acromegaly.

Dr. J. H. Gardiner is doing research on the assessment of cine radiographic



examinations of the temporomandibular joint in cases of suspected disc abnormality and with the Department of Orthopedics at the Toronto Western Hospital, on a study of the incidence of venous thrombosis in cases of hip fracture.

Dr. J. Halls is carrying out a radiological-pathological review of primary Crohn's disease of the colon, autopsy studies on haustral fold patterns, and *in vivo* and specimen correlation of arteriographic patterns in the colon.

In association with Dr. Hugh Little, Department of Medicine, Dr. J. N. Harvie is continuing studies of multiple epiphyseal dysplasia tarda and ankylosing spondylitis – a 25-year follow-up study.

Dr. R. B. Holmes, in conjunction with Dr. K. W. Taylor, Department of Medical Biophysics, is assessing the values and limitations of the Image Isocon tube in diagnostic radiology.

Dr. A. Humphry, with Dr. J. D. Burrington, Department of Surgery, is carrying out research on partial duodenal obstruction of the newborn, due to abnormal fixation.

Dr. E. L. Lansdown, with Dr. Afzal Baki, Department of Radiology, has concluded studies on the assessment of renal artery aneurysms and with Dr. F. S. M. Walk, Department of Radiology, on vascular abnormalities of face and neck.

Dr. J. L. McIntyre is involved in studies of: (a) arteriography in encephalitics and hemiatrophy of the skull; (b) linear tomography of the petrous bone; (c) high-volume weight bearing myelography; and (d) retrograde jugular venography. Collaborators include Drs. J. T. Marotta, T. Maloney, S. Schatz, J. Evans, R. Fielder and P. Smith.

Dr. R. M. Parrish is continuing his investigation of the post-operative assessment following hiatus hernia repair.

Drs. Hector Ma and David Swales are studying the radiological changes following mediastinoscopy. Dr. Hector Ma is also doing a comparative study of aqueous Dionosil and oily Dionosil as a bronchographic agent.

Dr. N. L. Patt is collaborating with the Department of Urology at St. Michael's Hospital in the study of p.o. evaluation of urethro-ileostomy by i.v. urography and in cine-radiographic study of nephroptosis by hydration i.v. urography. Studies of correlation of coronary arteriography with myocardial disease as assessed by ECG are also being carried out by Drs. Patt and A. Selky of the Department of Medicine.

Dr. H. E. Meema has completed the first half of a two-year study of comparative *in vivo* bone mineral studies in cancerous and non-cancerous patients. He has also initiated in collaboration with the Department of Pathology, Toronto Western Hospital, on correlative pathological-radiological studies on bone structure during aging process and in metabolic bone disease.

Dr. C. A. F. Moes is continuing his investigation of the types of arterial septal defects demonstrated angiocardialogically and also with Dr. R. M. Shaher, Department of Medicine, his studies into the radiologic and angiocardialogic features of a double-outlet right ventricle.

Dr. B. J. Reilly has completed the following projects: (1) With Drs. J. R. Hamilton, Department of Medicine, and M. J. Lynch, Department of Pathology, active celiac disease in childhood – clinical and laboratory findings of forty-two cases; (2) With Drs. J. R. Hamilton, and R. Morecki, Department of Medicine, short small intestine associated with malrotation – a newly described congenital cause of intestinal malabsorption; (3) With Dr. E. Rusiewicz, Department of Radiology, the significance of isolated upper pole calyceal dilatation. Doctor Reilly is carrying out new projects on a clinical trial using "Isopaque-300" in intravenous pyelography (with Dr. C. W. Birkett, Winthrop Laboratories); a follow-up study on cases of respiratory distress in the new born (with Dr. L. Linsao, Department of Medicine); correlation of radiological findings and respiratory function studies in cystic fibrosis (with Dr. H. Levison, Department of Medicine); an osteomyelitis study (with Dr. W. Bobechko, Orthopedic Service, and Drs. P. Fleming and S. Huda, Department of Bacteriology, Hospital for Sick Children).



Dr. D. E. Sanders in co-operation with Drs. N. C. Delarue and S. Silverburg, Department of Surgery, is evaluating the techniques used in all pulmonary angiograms carried out at the Toronto General Hospital since 1957, those patients with proven primary pulmonary neoplasms are being subjected to special review in conjunction with other pre-operative investigations, operative and pathological findings, and follow-up data. He is also continuing projects on: (1) the evaluation of long-term effects of smoking in women with Dr. C. R. Woolf, Department of Medicine, and his staff; (2) the investigation and treatment in pulmonary emphysema with Drs. C. R. Woolf, D. E. Wood, Department of Medicine, N. C. Delarue and F. G. Pearson, Department of Surgery; and (3) the application of transthoracic aspiration needle biopsy in localized intrathoracic disease with Drs. N. C. Delarue, F. G. Pearson, Department of Surgery, and D. W. Thompson, Department of Pathology.

Dr. David Swales is investigating chondrocalcinosis.

Dr. P. C. Thorfinnson, with Dr. Glen Taylor, Department of Surgery, is doing a post-operative study of patients who have had surgical treatment for varicose veins of the lower extremity.

Members of the Department of Radiotherapy are participating in the following research projects supported by the Ontario Cancer Treatment and Research Foundation:

1. Ovarian Irradiation and Prednisone following Surgery for Carcinoma of the Breast (Drs. J. W. Meakin, W. E. C. Allt, F. A. Beale, T. C. Brown [Dept. of Medicine], P. J. Fitzpatrick, N. V. Hawkins, and Dr. R. D. T. Jenkin) – \$13,250.
2. Immunotherapy in the Management of Trophoblastin Tumours (Drs. W. D. Rider and B. Cinader [Dept. of Medicine]) – \$3,000.
3. Pre-operative Radiation in Operable Cancer of Rectum (Dr. W. D. Rider) – \$5,500.
4. Fractionation Study in the Radiation of Patients suffering from Glioblastoma Multiforme (Dr. W. J. K. Simpson) – \$5,500.
5. Effect of Multiple Daily Dose Fractionation on Skin Tolerance (Drs. C. L. Ash, W. R. Bruce [Dept. of Medicine], and G. F. Whitmore [Dept. of Medicine]) – \$2,600.
6. The Value of Local or Regional Radiation in Early Hodgkin's Disease (Drs. M. Vera Peters, T. C. Brown [Dept. of Medicine] and R. E. Alison [Dept. of Medicine]) – \$10,500.
7. To Study in Detail the Construction and use of Oxygen Micro-Electrodes (Drs. R. S. Bush and W. D. Rider) – \$3,680.
8. Effect of Fractionation Regimes on the Survival of Tumour and Normal Cells in Mice (Dr. N. V. Hawkins and Dr. W. R. Bruce [Dept. of Medicine]) – \$6,875.
9. An Exploration and Development of the Uses of the Computer in Radiotherapy (Drs. J. R. Cunningham [Dept. of Medical Biophysics], W. D. Rider and Mr. J. Milan [Dept. of Medical Biophysics]) – \$7,400.

#### HONOURS

CLIFFORD L. ASH, 1st Vice-President, American Radium Society.

GUNIS EGE, Congress Award, Canadian Association Radiologists, Quebec City, P.Q., April 1968, best paper presented by a Resident. Cancer of the Male Breast; reappraisal.

R. BRIAN HOLMES, elected Treasurer and Director of the Radiological Society of North America.

#### SCHOLARLY ADDRESSES

During the year 1967–68, in addition to routine duties, members of the staff gave lectures and papers to other than local groups, as follows.

W. E. C. ALLT, Visiting Lecturer to Good Samaritan Hospital, Dayton, Ohio.

F. A. BEALE, Urological X-Ray Seminar, College of Medicine, University of Cincinnati.



R. F. COLAPINTO, Royal College of Physicians and Surgeons of Canada, Toronto.

J. W. DAVIDSON, Royal College of Physicians and Surgeons of Canada, Toronto; Canadian Association of Radiologists, Quebec City; Second International Congress on Lymphology, Miami, Florida; Association of University Radiologists, Columbus, Ohio.

P. J. FITZPATRICK, Royal College of Physicians and Surgeons of Canada, Toronto; Canadian Association of Radiologists, Quebec City.

R. B. HOLMES, Visiting Professor at Yale University School of Medicine and at Harvard University School of Medicine; Royal College of Physicians and Surgeons of Canada, Toronto.

R. D. T. JENKIN, Ontario Cancer Treatment and Research Foundation, Hamilton; Symposium on Neoplasms in Childhood, M. D. Anderson Hospital and Tumour Institute, Houston, Texas; Royal College of Physicians and Surgeons of Canada, Toronto; Canadian Association of Radiologists, Quebec City.

E. L. LANSDOWN, Royal College of Physicians and Surgeons of Canada, Toronto; University of Manitoba.

HECTOR MA, Ontario Thoracic Society, Toronto.

J. L. MCINTYRE, Radiological Society of North America, Chicago.

D. L. McRAE, The 1968 Wilder Penfield Lecture at the American University in Beirut; The III Canadian Congress of Neurological Sciences, Vancouver.

H. E. MEEMA, Conference on Progress in Methods of Bone Mineral Measurement, National Institute of Health, Bethesda, Maryland; "Symposium Ossium" of European Association of Radiology, London, England; American Geriatric Society, New Orleans, Louisiana; (Symposium) to the Section of Geriatrics, Ontario Medical Association, Toronto.

R. M. PARRISH, Royal College of Physicians and Surgeons of Canada, Toronto; Canadian Association of Radiologists, Quebec City.

M. VERA PETERS, Radiological Society of North America, Chicago; Royal College of Physicians and Surgeons of Canada, Toronto; (Gordon Richards Memorial Lecture) Canadian Association of Radiologists, Quebec City; Symposium of the International Society of Lymphology, Miami Beach, Florida.

B. J. REILLY, Canadian Association of Radiologists, Quebec City; Canadian Association of Radiologists, Western Ontario Section, London, Ontario; Seminar at St. Joseph's Hospital, London, Ontario (Visiting Teacher).

W. D. RIDER, Ontario Cancer Treatment and Research Foundation, Lake Couchiching, Ontario; Visiting Lecturer at Camp Borden, Ontario; American Radium Society, Miami Beach, Florida; Halifax General Hospital, Nova Scotia; Temple University, Philadelphia.

D. E. SANDERS, Visiting Professor to the Division of Postgraduate Medical Education, Dalhousie University, and to the Atlantic Provinces Radiological Conference at Dalhousie University; Royal College of Physicians and Surgeons of Canada, Toronto.

W. J. K. SIMPSON, IXth Interamerican Congress of Radiology, Montevideo, Uruguay.

G. WORTZMAN, Royal College of Physicians and Surgeons of Canada, Toronto.

#### PUBLICATIONS

DAVIDSON, J. W. "Lymphography in Malignant Disease: Radiological Aspects" (*Canadian Medical Association Journal*, vol. 97, no. 21, Nov. 25, 1967, pp. 1282-9).

FITZPATRICK, P. J. "The Nasopharyngeal Angiofibroma" (*Journal of the Faculty of Radiologists*, vol. 18, no. 1, Jan. 1967, pp. 62-8).

——— "Tumours of the Skin" (*The Canadian Nurse*, vol. 63, Feb. 1967, pp. 45-7).

HARWOOD-NASH, D. C. F., and LANSDOWN, E. L. "Evaluation of the Urea Washout Pyelogram and Urography in the Assessment of Renovascular Hypertension" (*Canadian Medical Association Journal*, vol. 96, no. 5, Feb. 4, 1967, pp. 245-56).

HARWOOD-NASH, D. C. F., LANSDOWN, E. L., *et al.* "Nephrotomography in Various Renal Disorders" (*Journal of the Canadian Association of Radiologists*, vol. 18, no. 4, Dec. 1967, pp. 427-33).



- JENKIN, R. D. T., PETERS, M. V., and DARTE, J. M. M. "Hodgkin's Disease in Children" (*American Journal of Roentgenology*, vol. 100, no. 1, May 1967, pp. 222-6).
- LEVISON, H., WENTWORTH, P., SIMPSON, J., MOES, C. A. F., *et al.* "Open Lung Biopsy in Children" (*American Review of Respiratory Disease*, vol. 97, no. 4, April 1968, pp. 673-84).
- McRAE, D. L., *et al.* "The Occipital Horns and Cerebral Dominance" (*Neurology*, vol. 18, no. 1, Jan. 1968, pp. 95-8).
- MOES, C. A. F., GOLDMAN, B. S., and MUSTARD, W. T. "Anomalous Pulmonary Venous Drainage from the Left Lung into a Left Vertical Vein" (*Journal of the Canadian Association of Radiologists*, vol. 18, no. 3, Sept. 1967, pp. 377-81).
- PETERS, M. Vera. "Lymphography in the Management of Malignancies, Particularly Lymphomas" (*Canadian Medical Association Journal*, vol. 97, no. 21, Nov. 18, 1967, pp. 1278-82).
- "Natural History of the Lymphomas Related to the Clinical Classification" (*International Conference on Leukaemia-Lymphomas*, University of Michigan, Ann Arbor, Oct. 1967).
- SANDERS, D. E. "Pleural Mesothelioma" (*Journal of the Canadian Association of Radiologists*, vol. 19, June 1968, pp. 64-73).
- SIMPSON, W. J. K., PLATTS, M. E., *et al.* "Metastatic Cerebellar Sarcoma (Desmoplastic Medulloblastoma) with Diffuse Osteosclerosis and Leukoerythroblastic Anemia" (*American Journal of Roentgenology*, vol. 103, no. 1, May 1968, pp. 38-43).
- WORTZMAN, G., *et al.* "The Neurotoxic Effect of Water-Soluble Contrast Media in the Spinal Canal with Emphasis on Appropriate Management" (*Journal of the Canadian Association of Radiologists*, vol. 19, no. 2, June 1968, pp. 206-303).
- WORTZMAN, G., and DEWAR, F. P. "Rotary Fixation of the Atlantoaxial Joint" (*Radiology*, vol. 90, no. 3, March 1968, pp. 479-87).

## SURGERY

*Under the direction of Professor W. R. Drucker*

After a feasibility study of one year, the Faculty voted during the spring to adopt a major revision of the curriculum. Coupled with the excitement of significant change and more democratic conduct of curricular affairs, is a sobering realization that many new and difficult problems must be solved. This is particularly true for clinical departments such as Surgery which have many specialty divisions. Not only must a clinical clerkship be organized which permits meaningful participation of students in the daily care and study of patients, but the clerkship should include an exposure to each of the surgical specialties and faster interdepartmental pedagogy. Definition of a core clinical experience is necessary before a realistic programme of electives can be arranged. Somehow, the enthusiasm of each surgical specialist to cover a broad spectrum of interesting problems must be curtailed to allow time for unfettered study by the student. Individual aptitudes and interests of students should be nourished; there is no case for imposing a uniform curriculum on all. During the past two years, the surgical services at the Wellesley Hospital, under the direction of Dr. Neil Watters, have developed a clinical clerkship which has been warmly received by the students. It is anticipated that, during the next year, other Hospitals will develop clerkships, differing in form, but guided by the basic principles of the revised curriculum.

The programme for graduate (residency) education has continued to function smoothly under the able guidance of Dr. Robert A. Mustard. Due to the increasing pressure of work entailed by Dr. Mustard's position as Associate Director of the Department, many of the responsibilities of the residency programme have been assumed by Dr. Owen V. Gray. During the past year, 165 applicants were received for 44 vacancies in the surgical residency programme; also, 32 men have spent the past year in full-time investigative work. The obligations of this residency programme could not be met without the co-operative assistance of the Surgeons-in-Chief and the Directors of the Inter-Hospital Co-ordinating Committees for the surgical specialties.

Activities of the Department have been nourished and facilitated by the competent assistance of the Departmental Secretary, Dr. N. T. McPhedran.



This year, under the able guidance of Dr. E. Bruce Tovee, a Co-ordinating Committee for General Surgery was established. This Committee is tackling the problem of defining the identity and content of "general surgery" and its relationship to the other surgical specialties, both in postgraduate training and in practice.

Under the leadership of Dr. Leslie Bowman, the Chief Residents in the teaching hospitals have organized monthly meetings to discuss problems of mutual interests. A product of these meetings was the inception of a series of bi-weekly evening seminars devoted to discussion of the pathophysiology of clinical disorders. These sessions have been so successful that they will be formally incorporated into the residency programme, replacing the traditional Friday afternoon lectures.

Due to the proposed expansion in the undergraduate student body, coupled with the trend for all residency education to become university-based, there is need to expand the Faculty. Our major need is for new faculty members who will develop imaginative programmes of research. The McLaughlin Foundation has made it possible for prospective staff appointees to study at centres abroad and to bring back concepts for investigation. It is now necessary for the University to develop an environment which will facilitate concurrent research and clinical experience.

In partial solution of some of these problems, the Toronto General Hospital is proceeding with a total re-organization into teaching units which will include all patients, in each service, both public and private. In the Department of Surgery, these changes have been accomplished with the able and persistent assistance of Dr. J. R. Frank Mills, Dr. John Palmer and Dr. Donald Robertson. Control of admissions and discharge, ambulatory care and operating room facilities will be the responsibility of each unit director.

Another change designed to foster the optimal academic development of members of our staff is a transition toward a full-time faculty. Limitation of financial resources precludes at present the possibility of offering full-time appointments to all members of the faculty. However, we do feel that if the responsibilities for university function are to be met, many senior experienced clinicians must be provided an opportunity to join a full-time faculty. At the moment, only new members of the faculty can be granted this privilege. The numerous problems associated with this change are under study by a Committee of this Department composed of Drs. Robert A. Mustard, E. B. Tovee, and Donald R. Wilson. Without continuous and increasing financial support, expanded laboratory facilities and office space and guarantee of an adequate number of beds, the activities of this group will become fatuous.

If the intellectual functions of this University's School of Medicine are to thrive, students, residents, fellows and individual faculty members must be accorded more meaningful representation in the policy-making bodies of the academic community. And yet, democratization of faculty organization must not inhibit pursuit of excellence in academic affairs. Overall is the pragmatic realization that university life owes its continued existence to public support and it must be responsive to the needs of society. Thus, abundant problems confront our growth and development; the task would be unthinkable without the continued loyal support and unselfish assistance of members of the Surgical Faculty.

#### SURGICAL FACULTY

At the end of the current academic term, Dr. D. W. G. Murray retires from the active staff. Dr. Murray has stimulated a generation of medical students and young surgeons by his enthusiasm and dedication to research and teaching and his exemplary care of patients. We wish him well in the future. Dr. A. J. Davies is moving to the United States to go into private practice; Dr. J. G. Moffat has resigned to take up an appointment at Scarborough Centenary Hospital and Dr. J. C. Fallis will assume responsibilities for the Pediatric Surgical Service at the North York General Hospital.

Seventeen new appointees will join the faculty this year; Dr. J. R. Birch, Plastic Surgery, Hospital for Sick Children; Dr. Martin Barkin, Urology, Hospital for Sick Children; Dr. L. R. Bowman, General Surgery, Toronto General Hospital; Dr. Leith



Douglas, Plastic Surgery, the Wellesley Hospital; Dr. B. Goldman, Cardiovascular Surgery, Toronto General Hospital; Dr. R. D. Henderson, Thoracic Surgery, Toronto General Hospital; Dr. G. J. Lloyd, Orthopaedic Surgery, Toronto Western Hospital; Dr. R. E. Mathews, General Surgery, Toronto Western Hospital; Dr. R. Miyagishima, Cardiovascular Surgery, Toronto Western Hospital; Dr. J. T. Rankin, Urological Surgery, The Wellesley Hospital; Dr. M. Rang, Orthopaedic Surgery, The Hospital for Sick Children; Dr. J. Schatzker, Orthopaedic Surgery, The Wellesley Hospital; Dr. Robert Tym, Neurosurgery, The Wellesley Hospital; Dr. D. Weissberg, Thoracic Surgery, Toronto General Hospital; Dr. R. E. Louch, General Surgery, Toronto Western Hospital; Dr. C. Zaltz, Orthopaedic Surgery, St. Michael's Hospital; Dr. J. Yao, Cardiovascular Surgery, St. Michael's Hospital. We welcome them to our faculty.

Dr. K. E. Livingston, a graduate of Harvard University, joined the faculty in September 1967 as Neurosurgeon-in-Chief at the Wellesley Hospital. He comes with an outstanding background in education, research and clinical activity. For the past six years, he has directed development of neurosurgical services at two universities in Iran and from 1962-66, he was Associate Dean at the Pahlavi University Medical School. His capacity for leadership is reflected by the recent acquisition of Dr. Robert Tym of Scotland to join the neurosurgical service at Wellesley Hospital.

#### RESEARCH

Generous support for research has been provided by the Medical Research Council, Health Resources Fund, the Ontario Heart Foundation, the Ontario Cancer Treatment and Research Foundation, the Irving Heward Cameron Memorial Scholarship Fund, other government agencies and private donations. No serious commitment to investigative work could be possible without this support. But it is clear that if the objectives of the expanded educational programme are to be realized, significant increments of space, equipment, personnel and financial support must become available. The prospect of additional laboratory space becoming available in the new Medical Sciences Building early in 1969 has been a stimulus to the Faculty and a source of encouragement to the many young men now receiving experience in investigative work in laboratories in Europe and North America, who expect to return to this Faculty for a career in academic medicine.

Despite the increasing distractions of administrative chores and commitments to educational programmes, members of the faculty have continued productive research. The following catalogue of their activities is a clear indication of interest in and capacity for investigative work.

#### *Cardiovascular Surgery*

Dr. R. Baird, at the Toronto Western Hospital, continues his promising experimental and clinical studies of revascularization of the heart and of valve replacement. Dr. Bigelow, with the assistance of Dr. B. Bharadwaj, has done a follow-up study of patients with mitral valve replacement and, with the assistance of Dr. James Yao, has done a follow-up study of patients with aortic valve replacement. Dr. W. G. Bigelow, Dr. W. S. Egerton, Dr. J. E. Morch and Dr. H. E. Aldridge have initiated a prospective study of results of surgery for coronary artery disease. Dr. R. O. Heimbecker continues his experimental work related to myocardial infarction in calves and has studied the fate of homograft and heterograft valves in calves in which the fresh or radiation sterilized graft has been implanted into the tricuspid annulus. His studies of decompression sickness are continuing and in collaboration with Dr. I. Koven of the Department of Surgery at New Mount Sinai Hospital, the microcirculatory changes have been correlated with changes in plasma, red cell and extra cellular fluid volume. Pulmonary microcirculation in health and in hypovolemic shock is being studied in collaboration with Dr. J. C. King and Professor W. R. Drucker. Pulmonary embolism in patients is under study in collaboration with Dr. W. Keon. Dr. J. A. Key, in association with Dr. D. C. MacGregor and Dr. Aldridge, has



undertaken investigation of patients with left ventricular aneurysms. At the Hospital for Sick Children, Dr. W. T. Mustard continues his research on the use of a pedicle graft from the diaphragm to replace the ventricular wall and his studies with the membrane oxygenator designed by Dr. Walter Zingg, Chief of Experimental and Surgical Research. Dr. A. S. Trimble, assisted by Dr. R. Suri and Dr. B. McGraw, has been studying the problems of homograft aortic valve replacement. A simple external pulse duplicator has been developed which has permitted study of transplanted valve function in calf hearts. Investigation of methods of storage and sterilization of valves suggests that they may either be freshly acquired at sterile autopsy or stored in deep freeze after irradiation. Dr. G. A. Trusler, during the past year, has completed a study of the effect of growth after aortic valve replacement in calves, and is now studying pulmonary valve replacement. In conjunction with Dr. P. E. Conan, electron microscopic studies of post-perfusion lung and pulmonary hypertension have been undertaken. Dr. D. R. Wilson, assisted by Dr. R. Miyagishima, continues experimental work related to both heart and liver transplantation.

#### *General Surgery*

Dr. D. J. Currie, with Dr. D. S. Elliott and Dr. E. A. Nugent, has carried out research on the absorption of catgut sutures in human tissues, and also with Dr. D. S. Elliott has conducted research on the pathogenesis of cholecystitis and cholelithiasis. Dr. Halmagyi has assisted Dr. Currie in a study of upper gastrointestinal haemorrhage. Dr. A. J. Davies has completed a study of the effect of wound irrigation and topical kanamycin on the incidence of wound infection. Dr. N. C. Delarue continues active investigation of the relation of smoking to lung cancer. Dr. W. R. Drucker, in collaboration with Dr. J. King, Dr. J. Moffat and Miss Jean Schlatter, continues with investigations of the metabolic alterations of hemorrhagic and endotoxin shock. Dr. I. H. Koven is trying to develop a method for the rapid detection of radio-active sulphur in plasma and urine. His work continues on extracellular fluid changes in patients undergoing major surgery, and in co-operation with Dr. R. O. Heimbecker, he is studying the body fluid dynamics in dogs subjected to rapid decompression and in patients undergoing open heart surgery. Dr. Bernard Langer is developing a programme for homotransplantation of canine liver and the use of radioactive gold for immunosuppression. Dr. R. I. Mitchell is studying the nutritional aspects of various reconstructive procedures following total gastrectomy in the rat and the alterations in lung scans of autotransplanted canine lungs. Dr. J. A. MacDonald has completed a study of the results of injection of immunologically competent cells into rats. Dr. N. T. McPhedran, with Dr. M. Goldberg and Dr. R. Holliday, has continued his research on a secretagogue in blood draining on obstructed portal vein of the dog. He has initiated a study of the use of steroids and local anaesthetics injected into the site of local muscle-tendon separations. In co-operation with Dr. Colapinto of the Department of Radiology, a study has been started of the changes produced in the superior mesenteric artery in the presence of strangulating bowel obstruction.\* Dr. R. L. Ruderman continues work on the experimental production and dissolution of gallstones in rats by dietary means. A clinical research study of all patients treated at the Toronto General Hospital for lymphomas of the small bowel with particular attention to its association with idiopathic steatorrhea has been completed by Dr. W. J. E. Spence. Dr. E. B. Tovee, in collaboration with Dr. Alan Davies, has completed a detailed study of blunt abdominal trauma. He has also studied the ecology and pathology of motorcycle injury. In collaboration with Dr. Owen Gray, he completed a movie illustrating the synchronous combined abdominal-perineal resection of the rectum. Dr. R. H. Wilkinson has continued his studies of pH and pressure of the gastroesophageal junction with the hope of developing a further method of evaluating reflux esophagitis and also to evaluate the efficacy of operative repair of hiatus hernia in correcting reflux.

\*Dr. F. G. Pearson is studying early alterations in pulmonary function following transplantation of the lung; an experimental technique to avoid reflux after



esophagogastrostomy and he is continuing his very productive work on the etiology of post-tracheostomy tracheal stenosis. A practical extension of this work is an experimental study of the prevention of arterial erosion by the use of a Marlex prosthesis for tracheal reconstruction.

### *Neurosurgery*

Dr. J. F. R. Fleming, with the assistance of Dr. R. P. Humphreys and Dr. R. H. Sheppard, has continued his studies of spinal fluid dynamics with intrathecal isotopes in various clinical disorders and in animals. Dr. K. E. Livingston, in collaboration with Dr. C. Hockman, Department of Pharmacology and Dr. J. Talesnik, visiting Professor of Physiology from Santiago, Chile, has been able to demonstrate and begin the analysis of central modulation of autonomic outflow. This is the first time that central modulation of autonomic function has been analyzed; its application to many clinical disorders induced by stress and on the mechanisms of behaviour associated with narcotic addiction is under study. Under the direction of Dr. W. M. Lougheed, Dr. M. Ogata has worked on the problem of arterial spasm. An experimental model of arterial spasm in the cat's basilar artery has been produced and various means of stimulation have been investigated. Dr. Stanley Schatz has carried out a clinical project on the results of stereotactic surgical treatment of patients with disorders involving the basal ganglia. Dr. R. R. Tasker, with the assistance of Dr. Khunavudhi, has successfully completed a mapping study of cat thalamus, demonstrating the location of the 2nd somatic sensory relay nucleus in the posterior group of nuclei. Dr. B. Benoit, under the direction of Dr. Tasker, has completed an anatomic-physiological study of the tremorigenic drug harmaline in rats, furthering knowledge in tramorigenesis. Human thalamic mapping was pursued with the collaboration of Dr. L. W. Organ of the Department of Physiology and Dr. Rai Emmers of Columbia University. Dr. R. G. Vanderlinden is studying the effect of temperature on spinal injury. Clinical studies are underway on Arnold-Chiari malformation in adults and Cauda equina compression syndrome due to protruded lumbar discs.

### *Orthopaedic Surgery*

Under the direction of Dr. W. P. Bobechko, a new Legg-Perthes' brace has been developed. Dr. J. G. Evans is conducting a follow-up study of fractures of the neck of the femur, with Dr. Charles Zaltz, and a clinical study of total hip replacement arthroplasty with Dr. Paul F. McGoey and Dr. R. H. N. Fielden. Dr. R. H. N. Fielden has undertaken a clinical trial of immediate post-operative fitting of amputees. With the help of Mr. Glen Woolridge, M.Sc., Dr. W. R. Harris has designed an apparatus to test the distribution of force through the knee joint in various positions. With the assistance of Drs. R. W. Jackson and Farouk Abou-Keer differential tissue culture of different layers of the epiphyseal plates in animals is being studied to determine the metabolic requirements of each cell layer. Dr. R. W. Jackson is directing research projects on osteogenicity – tissue culture of bone and bone tumours – on biomechanical studies of bone and fracture repair, under the influence of heparin and on arthroscopy as an aid in the diagnosis and treatment of arthritis. Dr. Ian Macnab is carrying out investigation of microcirculation of the rotator cuff and also the effect of thiazide on the prevention of osteoporosis of immobilization. Dr. G. F. Pennal has completed a clinical review of non-union fractures of the pelvis. Dr. R. B. Salter, assisted by Dr. M. Rang, has continued with his work on an experimental model of Legg-Perthes' disease in the femoral head of young pigs. With the assistance of Dr. D. Duncan Murray he has continued his investigation related to the effects of repeated injections of hydrocortisone into joints and tendons using rabbits, dogs, and monkeys. Dr. David Turner has assisted Dr. Salter in a clinical project on the relationship of fatty acid metabolism to wound healing. Dr. Ian Blackstone has assisted with a follow-up study of 200 children with Legg-Perthes' disease with particular emphasis on the natural history of the disease and the factors in prognosis. In conjunction with Dr. S. K. Bhalla and Mr. H. Garside, Dr. E. H. Simmons has conducted research



on the biomechanical study of the cervical spine, and has also investigated the late assessment of the effects of Caisson Disease in compressed air workers with the assistance of Dr. J. A. Gamara. Experimental investigation of Cyrosurgery in the treatment of neoplasms of bone and soft tissues has been carried out with the assistance of Dr. A. Beaupre, Dr. H. Coleman and Dr. T. W. Barrington and Dr. D. C. Evans.

#### *Plastic Surgery*

Dr. W. K. Lindsay has completed a review of the end results of two cleft palate operations; a radical pushback procedure and a direct closure procedure. He also continues research studies on tendon healing. Emphasis has been placed on the relationship between mucopolysacchride and collagen metabolism in the tendon proper, particularly in the adhesions which form as a necessary part of tendon healing. Dr. H. G. Thomson is studying cervical burn contractures, three dimensional surgical programming for facial deformities and clinical skin colour matching for surgical tattooing. His research on skin graft hyperpigmentation and its relationship to contraction and melanogenesis continues.

#### *Urological Surgery*

Dr. V. Colapinto, with the assistance of Dr. J. L. T. Russell, Dr. A. Nafrawi and Dr. F. Aledia, has carried out research on survival of the isolated canine kidney with hypothermia and continuous perfusion. Dr. G. T. Cook has directed the surgical aspect of kidney transplantation. Dr. A. G. Keresteci is carrying out research on the pre-breathing of oxygen with radiotherapy in the treatment of bladder tumours. Dr. G. Gale, with Dr. W. K. Kerr is conducting a study of genito-urinary tuberculosis. Dr. P. Klotz, in conjunction with the Department of Bacteriology at New Mount Sinai Hospital, is studying the role of virus in urinary tract infection. With the help of Dr. Ali Talibi, Dr. C. J. Robson has carried out research on the electrical stimulation of the denervated canine bladder. Dr. J. L. T. Russell, with the assistance of Dr. Aledia is carrying out a review of urinary diversion patients. During the past year, with the assistance of Dr. Aledia and Dr. Armstrong, he has studied the prophylactic value of gantricin in transurethral resections and of Oxolinic Acid in genito-urinary infections.

#### HONOURS

Many honours were received by members of the Surgical Faculty during the past year. Of particular note was the 1967 award of the Gold Medal of the Royal College of Physicians and Surgeons of Canada to Dr. R. O. Heimbecker for his clinical and laboratory investigations on myocardial infarctectomy. McLaughlin Fellowships, intended to promote the education of physicians who will enter careers in academic medicine, were awarded to: Dr. Colin Bayliss, Dr. Norris Carroll, Dr. Leith Douglas, Dr. R. E. Falk, Dr. J. D. Graham, Dr. John Kostuik, Dr. Glen Taylor, Dr. Charles Zaltz. Current recipients of McLaughlin Fellowships who are at work in laboratories on both sides of the Atlantic include: Dr. Martin Barkin (Boston); Dr. Bernard Goldman (Boston); Dr. R. Henderson (Birmingham and Stockholm); Dr. Raymond Mathews (Dallas); and Dr. Joseph Schatzker (Göteborg and Edinburgh).

PROFESSOR RONALD BAIRD, elected to Council of the Society of University Surgeons.

PROFESSOR W. G. BIGELOW, LL.D., Brandon University; Honourary F.R.C.S., Royal College of Surgeons, London; President, Society for Vascular Surgery; First President, Canadian Federation for Thoracic and Cardiovascular Surgeons; Visiting Professor: University of Vermont and special lecturer to the Mayo Clinic. Appointed Moynihan Lecturer. Honorary Member, Ontario Medical Association.

DR. W. P. BOBECHKO, George Armstrong Peters Prize.

PROFESSOR D. R. BOHNEN, President, Academy of Medicine of Toronto.

DR. G. T. COOK, F.A.C.S.



DR. S. M. CHRIS, F.A.C.S.

PROFESSOR N. C. DELARUE, Centennial Medal; Governor, American College of Chest Physicians; Honorary Member, Canadian Red Cross Society (Citation and Medal).

PROFESSOR W. R. DRUCKER, Policy Study Group, Medical Research Council; Committee on Graduate Education, American College of Surgeons; Guest of Honour, Société de Chirurgie de Québec; Convocation Address, Toronto General Hospital School of Nursing; Ernest Janes Lecture, Hamilton Academy of Medicine; Board of Managers, American Association for Surgery of Trauma; Vice-Chairman, Surgical Forum Committee, American College of Surgeons; Visiting Professor: University of Saskatchewan, University of Rochester and University of Western Ontario.

DR. G. L. GALE, 1967 Travelling Scholarship, Canadian Tuberculosis Association.

PROFESSOR W. R. HARRIS, Guest Lectures, University of the West Indies.

PROFESSOR R. O. HEIMBECKER, Elected Member of American Surgical Association.

DR. H. J. HOFFMAN, F.A.C.S.

PROFESSOR ROBERT JACKSON, Visiting Professor, University of Kansas Medical Center; Treasurer, Association for Academic Surgery.

DR. BERNARD LANGER, F.A.C.S.

PROFESSOR J. E. MULLENS, Centennial Medal.

DR. D. W. G. MURRAY, Order of Canada.

PROFESSOR K. E. LIVINGSTON, Chairman, Neurosciences Research Seminar, Shiraz, Iran.

PROFESSOR IAN MACNAB, Visiting Professor, University of Pittsburgh, University of Virginia.

PROFESSOR N. T. MCPHEDRAN, Irving Heward Cameron Scholarship.

PROFESSOR T. P. MORLEY, Member, Board of Directors, Ontario Medical Association.

PROFESSOR W. T. MUSTARD, Fellow of the Council on Clinical Cardiology, American Heart Association; Dr. Adrian Ehler Memorial Lecture, Albany.

DR. JOHN PALMER, Member, Central Surgical Association.

PROFESSOR C. J. ROBSON, President, Canadian Urological Association.

PROFESSOR R. B. SALTER, Centennial Medal; appointed to Council, Medical Research Council of Canada; elected to Council, Royal College of Physicians and Surgeons of Canada; Visiting Professor: University of Texas, Galveston; Northwestern University; Dartmouth University; Guest Lecturer at University of the West Indies, University of Miami; 1967 Surgical Film Award – American Academy of Orthopaedic Surgery; Elected corresponding Member, Australian Orthopaedic Association.

DR. STANLEY SCHATZ, F.A.C.S.

DR. BARRY SHANDLING, F.A.A.P.

DR. S. SIDLOFSKY, F.A.C.S.

DR. EDWARD H. SIMMONS, Secretary, Canadian Orthopaedic Research Society; Chairman, Orthopaedic Section, Toronto Academy of Medicine.

DR. CHARLES TATOR, Awarded the 18th Mead Johnson Award for Graduate Surgery by the Board of Regents of the American College of Surgeons.

DR. H. G. THOMPSON, Master of Surgery (M.S.)

DR. E. B. TOVEE, Elected Member of the Council of Canadian Medical Protective Association.

DR. ALAN TRIMBLE, Member, Society of University Surgeons.

DR. G. A. TRUSLER, Centennial Medal.

DR. R. H. WILKINSON, F.A.C.S.

#### SCHOLARLY ADDRESSES

PROFESSOR W. G. BIGELOW, "Aortic Valve Replacement," American College of



Surgeons; "Special Problems in Cardiac Surgery," t.v. Panel, American College of Surgeons; a special lecture at Broussais Hospital.

DR. W. P. BOBECHKO, "Immunological Reactions of Articular Cartilage," the Canadian Orthopaedic Research Society.

PROFESSOR D. R. BOHNEN, "Structures and Function of Modern Health Complex," Wisconsin Surgical Society; "Intestinal Obstruction," Royal College of Surgeons.

DR. G. T. COOK, "Renal Transplant Surgery," Academy of Medicine.

DR. R. J. BAIRD, "A Practical Approach to Mechanical Support of the Circulation," the Colloquium on Assisted Circulation, Dusseldorf, Germany, and the International Cardiovascular Society in Vienna, Austria; "The Physiological Considerations in Myocardial Revascularization," the Canadian Medical Association; "Assisted Circulation," the Ontario Medical Association.

PROFESSOR F. P. DEWAR, lectures to orthopaedic centres in Brisbane, Adelaide, Melbourne, Sydney and Perth, as Official Guest of the Australian Orthopaedic Association and New Zealand Orthopaedic Association.

PROFESSOR W. R. DRUCKER, "Current Concepts of Shock," Ohio Chapter, American College of Surgeons; Panel on Problems in preoperative period, "Evaluation of Elderly Patient for Emergency Surgery," and Ciné Clinic, "Pancreatitis," Clinical Congress, American College of Surgeons; "Time for Change in Medical Education" and "Shock," Canadian College of General Practice; "Role and Organization of a Comprehensive Trauma Treatment Service in a Medical Center Hospital," University of Vermont; "The Development of Future Surgical Research Programs," Conference on Surgical Education, Winnipeg; "Metabolics Basis for Tolerance to Hypovolemic Shock," University of Rochester; "Need for Change in Medical Education," Laval University, University of Saskatchewan and University of Western Ontario; "The Management of Hemorrhagic Shock," and "Metabolic Definition of Irreversibility," University of Miami; "Metabolic Alterations in Hemorrhagic Shock," Windsor Academy of Surgeons and Wellington County Medical Association; "Metabolic Alterations in Hypovolemic Tolerant Animals," Society of University Surgeons; "Hemorrhagic Shock," Hamilton Academy of Medicine; "Intestinal Obstruction," Southeastern Surgical Congress; Water and Salt Metabolism in Shock: Effect of Corticosteroids," University of Illinois; "The Changing Philosophy of Medical Education," the Ontario Medical Association; "The Gospel of St. Flo," Toronto General Hospital School of Nursing.

DR. G. L. GALE, "The Prognosis of Genito-Urinary Tuberculosis," xix Conference of the International Union Against Tuberculosis, and again in Edinburgh.

DR. D. E. HASTINGS, "Rheumatoid Arthritis," Ontario Medical Association.

PROFESSOR R. O. HEIMBECKER, "Experimental Myocardial Infarction," University of Wisconsin; "Modern Trends in the Management of Shock" and "Modern Trends in the Management of Pulmonary Embolism," St. John's General Hospital; "Emergency Infarctectomy," Harman Hospital, Stephenville, Newfoundland; "Experimental Myocardial Infarction," Columbia University Medical Center; "Modern Trends in the Management of Pulmonary Embolism," Victoria, British Columbia Medical Society; "Experimental Myocardial Infarctectomy with a Preliminary Report on the Clinical Application," 40th Annual Meeting, American Heart Association in San Francisco; "Symposium on Aggressive Management of Coronary Artery Disease," University of Chicago and American College of Cardiology; "Decompression Sickness - A New Look at the Bends," Society of University Surgeons, New York; "Surgery for Heart Attacks," Medico-Legal Society of Ontario; "Surgery for Ventricular Aneurysm," Wisconsin Surgical Society at University of Toronto, "Surgical Treatment of Coronary Artery Disease," Columbia College of Physicians and Surgeons; "Decompression Sickness," U.S. Naval School, Washington Navy Yard, Washington, D.C.

PROFESSOR W. R. JACKSON, "Arthroscopy," Canadian Orthopaedic Association Meeting; "A Biomechanical Approach to the Study of Fracture Healing,"



Canadian Orthopaedic Association (Research Section); "A Surgeon Looks at the Knee Joint" and "Arthroscopy of the Knee Joint," Massachusetts General Hospital; "Osteogenesis—*In Vitro* and *In Vivo* Studies," Toronto Western Hospital Medical Research Seminar.

DR. A. G. KERESTECI, "Pre-Breathing Oxygen with Radiotherapy in Treatment of Bladder Tumours," Lake Couchiching Clinical Conference.

DR. P. G. KLOTZ, "Primary Adult Ureterovesical Reflux," Wisconsin Surgical Society.

DR. BERNARD LANGER, "Vagotomy and Pyloroplasty in the Treatment of Massive Haemorrhage from Duodenal Ulcer" and "The Pathophysiology of Bowel Obstruction," Royal College of Surgeons.

PROFESSOR IAN MACNAB, "Spondylolisthesis," New Jersey Orthopaedic Society; "Failures of Spinal Surgery," Interstate Orthopaedic Society, Pittsburgh; "Results of Orthopaedic Surgery on the Rheumatoid Hand," Pan American Congress of Rheumatology; "The Painful Shoulder," Southwestern Michigan Surgical Society; "Soft Tissue Injuries of the Cervical Spine: The Pathogenesis of Symptoms Due to Intervertebral Disc Disease," American Academy of Orthopaedic Surgeons; "Management of Painful Spondylolisthesis" and "Negative Laminectomy," American Academy of Orthopaedic Surgeons; "Cervical Spondylosis," Nicholas Andry Society, Orange, California; "Advances in Surgery of the Cervical Spine," U.C.L.A.

PROFESSOR N. T. MCPHEDRAN, "Acute Pancreatitis" and "Athletic Injuries," Essex County Medical Society; "Athletic Injuries," Canadian Forces Hospital, Halifax.

PROFESSOR T. P. MORLEY, "Giant Intracranial Aneurysms," Annual Canadian Congress on Neurological Sciences and to Society of British Neurological Surgeons-Neurosurgical Society of America joint meeting in New York City; "The Failure of Radiation Therapy to Prolong Survival Time in Gliomas," Annual Scientific meetings of Ontario Cancer Treatment and Research Foundation and American Association of Neurological Surgeons.

PROFESSOR J. E. MULLENS, "Post Bulbar Peptic Ulceration of the Duodenum," Canadian Association of Gastroenterology.

PROFESSOR F. G. PEARSON, "An Experimental and Clinical Study using a Porous Prosthesis for Reconstruction of Circumferential Tracheal Defects," Clinical Cancer Research Conference, Lake Couchiching; "Tracheal Stenosis as a Complication of Tracheostomy," Ontario Thoracic Society; "Tracheal Stenosis Complicating Tracheostomy with Cuffed Tube: Clinical Experience and Observations from a Prospective Study," Trauma Committee, American College of Surgeons, American Broncho-esophagological Association, Hollywood Beach, Florida, and Janes Surgical Society Meeting, Ohio, Central Surgical Association, Cleveland; "Complications of Tracheotomy and Endotracheal Intubation," Canadian Anaesthetists' Society Meeting, Ottawa; "The Role of Vagotomy and Pyloroplasty in the Therapy of Symptomatic Hiatus Hernia," Society for Surgery of the Alimentary Tract, San Francisco.

PROFESSOR G. F. PENNAL, Instructional Course on Ankle Injuries of American Academy of Orthopaedic Surgeons.

PROFESSOR C. J. ROBSON gave the Archibald Grace Memorial Lecture to the Southwestern Surgical Society; "Results of Radial Nephrectomy for Renal Cell Carcinoma," American GU Surgeons meeting in Florida.

DR. R. L. RUDERMAN, "Experimental Cholelithiasis," Wisconsin Surgical Society.

DR. J. L. T. RUSSEL, "A New Operation for Post-Prostatectomy Incontinence," Canadian Urological Association.

PROFESSOR R. B. SALTER was the Medical Research Council Visiting Professor to the University of Saskatchewan; Gibson Memorial Lecture, University of Manitoba, and Guest Lecturer at: University of Mexico, University of Pittsburgh, University of British Columbia, New England Roentgen Ray Society, Georgia Orthopaedic Association, Calgary Orthopaedic Association, St. Louis Orthopaedic Society,



Northern Newfoundland Medical Association, Latin American Society of Orthopaedics and Traumatology, American Academy of Orthopaedic Surgeons course on Trauma.

DR. E. H. SIMMONS, "A Clinical and Biomechanical Analysis of Supracondylar Fractures of the Elbow," Rocky Mountain Traumatology Meeting, Aspen; "Atlanto-axial Arthrodesis Using the Gallie Technique," American Academy of Orthopaedic Surgeons; "Anterior Cervical Discectomy and Fusion – A Clinical and Biomechanical Study," Canadian Orthopaedic Association, and a sound film of the same title to the American Academy of Orthopaedic Surgeons; "Further Observations on the Technique and Indications for Wedge Resections of the Spine," Scoliosis Research Society, Minneapolis; "Neck Injuries Caused by Rear End Collisions," American Academy of Orthopaedic Surgeons; "Pain in the Neck," American College of Surgeons.

DR. W. J. E. SPENCE, "Surgical Aspects of Chron's Disease and Ulcerative Colitis," Toronto-Buffalo-Rochester Radiological Society.

DR. R. R. TASKER, "Tremorine Tremor as an Electrophysiological Laboratory Model," 2nd International Congress of Neurogenetics and Neuroophthalmology, Montreal; Closed Circuit t.v. Panel Discussion on Parkinson's Disease, Clinical Congress, American College of Surgeons; "Brain Impedance for localizing Brain Tumours," American Academy of Neurological Surgery; "A Double Somatotopic Representation in the Human Thalamus and its Application in Localization During Thalamotomy for Parkinson's Disease," 11th Symposium on Parkinson's Disease, Edinburgh.

DR. H. G. THOMSON, "Flexor Tendon Glide Study," the Plastic Surgery Research Council, North Carolina; "The Effect of Proximal Flexor Tendon Release in Monkey Hand Tendon Repairs," Canadian Plastic Surgery Society.

PROFESSOR E. B. TOVEE, "Injuries to Motorcycle Policemen," American Association for Surgery of Trauma; "Blunt Abdominal Trauma," American College of Surgeons; "Motorcycle Injuries," Sydenham Society, Toronto; "Intestinal Obstruction," Royal College of Surgeons; Movie – "Two-Team Abdominal-Perineal Resection of Rectum," Clinical Congress, American College of Surgeons; Panels, Canadian Medical Protective Association and American College of Surgeons on "Perforated Duodenal Ulcer."

DR. A. S. TRIMBLE, "Muscular Subaortic Stenosis," American College of Surgeons; "An *In Vitro* Cinematographic Pulse Duplicator Study of Homograft Aortic Valve Function," Canadian Cardiovascular Society; "Valve Transplantation," t.v. Panel, Ontario Medical Association.

PROFESSOR WALTER ZINGG, "Membrane Oxygenator for Infants," American Society for Artificial Internal Organs; "Studies on the Relationship between Blood Viscosity and Hematocrit," Federation of Biological Societies; "Studies on Rewarming Shock," Defence Research Board of Canada; "An Approach to Studies on Biorheology," University of Texas; "Some Observations on the Biorheology of Blood," the Cardiovascular Surgeons Club.

#### SPECIAL EVENTS AND VISITORS

During the past year the Department has been honoured by meetings of: The Trauma Committee of the American College of Surgeons; The Medical-Legal Society; The Ontario Medical Association; The Royal College of Physicians and Surgeons; The Wisconsin Surgical Club; The British Orthopaedic Travelling Fellows; Cardiovascular Surgeons Travel Club.

The Department also has been pleased to welcome a number of distinguished visitors, many of whom participated actively in the undergraduate and graduate programmes.

#### *Cardiovascular Surgery*

Dr. Raul Baj, Mexico City; Dr. W. T. Barnes, Danville, Pa.; Mr. Ronald Belsey, Bristol, England; Dr. John Dark, Manchester, England; Dr. William S. Dye,



Chicago, Illinois; Dr. S. H. Farrell, Wales; Dr. F. S. Gerbasi, Detroit, Michigan; Dr. S. Holesh, London, England; Dr. Brian Johnstone, Fort Frances, Ontario; Dr. M. Kucera, Prague, Czechoslovakia; Dr. Richard Lenerhefer, Vienna, Austria; Dr. W. D. MacDonald, Calgary, Alberta; Dr. Andre McClish, Quebec City, P.Q.; Dr. Owen W. Miller, Columbia, Mo.; Dr. Emerson Moffitt, Rochester, Minnesota; Dr. E. A. Osius, Detroit, Michigan. Dr. G. B. Parulkar, Bombay, India; Dr. Shigeru Sakakibarga, Tokyo, Japan; Dr. J. A. Simpson, Perth, Australia; Dr. S. Singh, Edmonton, Alberta; Dr. R. E. Taber, Detroit, Michigan; Dr. L. D. Wilcox, London, Ontario; Dr. S. W. Winslow, Battle Creek, Michigan; Dr. J. A. Witter, Detroit, Michigan; Dr. Liebermann Yair, Israel; Professor Zudiasz, Budapest, Hungary.

### *General Surgery*

Professor John H. Davis, Western Reserve University, Cleveland; Dr. Adrian Mars-ton, Middlesex Hospital, London; Dr. John E. McBirnie, Visiting Professor of Community Surgery, Port Colborne, Ontario; Professor Wm. V. McDermott, Harvard University, Boston; Dr. Basil Morson, St. Mark's Hospital, London; Professor Paul Schloerb, University of Kansas; Dr. Roy Selby, Kuala Lumpur, Malaysia; Dr. Y. Sunami, Okayama, Japan. Dr. Norman Cecil Tanner, McLaughlin-Gallie Visiting Professor, London; Mr. Lawrance Wade, James IV Visitor, Cardiff, Wales.

### *Orthopaedic Surgery*

British Travelling Fellows—Dr. B. J. Dooley, St. Vincent Hospital, Melbourne, Australia; Dr. M. A. R. Freeman, The London Hospital Medical College; Dr. A. N. Henry, Guy's Hospital, London; Dr. W. M. McQuillan, Edinburgh Royal Infirmary; Dr. A. R. McKenzie, University of Otago, New Zealand; Dr. Brian McKibbin, University of Sheffield. Dr. C. L. Greaves and Dr. J. B. Maloney, Sydney, Australia; Professor Carl Hirsch, University of Goteborg; Professor A. R. Hodgson, University of Hong Kong; Dr. Jennifer Jowsey, Rochester, Minnesota; Mr. Kingsmill-Moore, London, England; Dr. Ross Nicholson, New Zealand; Dr. Peter Williams and Dr. Keith Daymond, Australia.

### *Neurosurgery*

Dr. Claude Bertrand, Montreal, P.Q.; Dr. Kevin Bleasel, Sydney, Australia; Dr. B. H. Dawson, Salford, England; Dr. Joel Guelmann, Rio, Brazil; Dr. Antony Jefferson, Sheffield, England; Dr. Alan Kerr, Liverpool, England; Dr. Keith Langford, Melbourne, Australia; Dr. Charles Langmaid, Cardiff, Wales; Dr. Jean Lecuire, Lyon, France; Dr. Andrew Masson, University of the West Indies, Jamaica; Dr. A. Paterson, Killearn, Scotland; Dr. John Potter, Oxford, England; Dr. J. M. Small, Birmingham, England; Dr. S. K. Wang, Taiwan; Dr. M. L. Wheatley, Parry Sound, Ontario; Dr. John D. Yeo, Sydney, Australia.

### *Urological Surgery*

Dr. Thomas Gibson, Paisley, Scotland; Dr. I. F. K. Muir, Middlesex, England; Dr. John C. Mustardé, Glasgow; Dr. Roger C. B. Pugh, London, England; Dr. Romando Trabucco, Buenos Aires; Dr. David M. Wallace, London, England; Dr. Turner Warwick, London, England.

### PUBLICATIONS

- BAIRD, R. J., COHOON, W. J., SPRATT, E. H., and WILLIAMS, W. G. "Improved Internal Mammary Implant Operation for Myocardial Revascularization" (*Circulation*, vol. 36, supp. 2, Oct. 1967, p. 60).  
 ——— "An Improved Method of Myocardial Revascularization with a Vascular Implant" (*Archives of Surgery*, vol. 95, Nov. 1967, pp. 724–35).  
 ——— "A Modification of the Internal Mammary Implant Operation" (*Annals of the Royal College of Physicians and Surgeons of Canada*, vol. 1, Jan. 1968, p. 23).  
 ——— "Myocardial Revascularization with Femoral Artery and Vein Autografts" (*Canadian Journal of Surgery*, vol. 10, Oct. 1967, pp. 474–82).



- BIGELOW, W. G., TRIMBLE, A. S., ALDRIDGE, H. E., BEDARD, PIERRE, SPRATT, E. H., and LANSDOWN, E. L. "The Problem of Insufficiency following Homograft Replacement of the Aortic Valve" (*Journal of Thoracic and Cardiovascular Surgery*, vol. 54, no. 4, Oct. 1967, pp. 478-90).
- BIGELOW, W. G., TRIMBLE, A. S., AUGER, PIERRE, and WIGLE, E. D. "Aortic Homograft Valve Replacement of the Mitral Valve" (*Journal of Thoracic and Cardiovascular Surgery*, vol. 54, no. 3, Sept. 1967, pp. 438-42).
- CURRIE, D. J., STITT, R. B., and HESLIN, D. J. "Gall-Stone Ileus" (*British Journal of Surgery*, vol. 54, no. 8, Aug. 1967, pp. 673-8).
- DELARUE, N. C. "Lay Instruction in Cardiopulmonary Resuscitation" (*Canadian Medical Association Journal*, vol. 97, no. 2, July 8, 1967, p. 90).
- "Let's Put Cigarette Smoking in its Proper Perspective. Part I, Mortality Experience; Part II, Morbidity Experience" (*Health*, vol. 35, no. 4, Aug. 1967, p. 14; no. 5, Oct. 1967, p. 14).
- "A Re-evaluation of the Use of Adrenalectomy in Metastatic Mammary Carcinoma" (*Simep Editions*, Lyon, France, 1967, pp. 23-30).
- DEWAR, F. P., and YABSLEY, R. H. "Fracture-Dislocation of the Shoulder" (*Journal of Bone and Joint Surgery*, vol. 49B, Aug. 1967, pp. 540-3).
- DRUCKER, W. R. (with SCHMIDT, G. H.) "Effect of Hemorrhagic Shock on Wound Healing in Rats and Guinea Pigs" (*Journal of Surgical Research*, vol. 7, no. 11, Nov. 1967, pp. 513-19).
- DRUCKER, W. R. (with SCHLATTER, J. E. and DRUCKER, R. P.) "Metabolic Factors Associated with Induced Tolerance for Hypovolemia" (*Journal of Laboratory and Clinical Medicine*, vol. 70, 1967, pp. 983-4).
- FLEMING, J. F. R., and PETRIE, D. "Traumatic Thrombosis of the Internal Carotid Artery with Delayed Hemiplegia" (*Canadian Journal of Surgery*, vol. 11, April 1968, pp. 166-72).
- GALE, G. L., and DELARUE, N. C. "Leiomyosarcoma of the Bronchus" (*Diseases of the Chest*, vol. 52, no. 2, Aug. 1967, pp. 257-60).
- GIBSON, D. A. "Congenital Dislocation of the Hip: A Review of Adults Treated in Childhood" (*Canadian Journal of Surgery*, vol. 10, July 1967, pp. 288-98).
- HALL, J. E., SALTER, R. B., and BHALLA, S. K. "Congenital Short Tendon Calcaneus" (*Journal of Bone and Joint Surgery*, vol. 49B, Nov. 1967, pp. 695-7).
- HARRIS, W. R., and HOUSTON, J. K. "Partial Amputations of the Hand: A Follow-up Study" (*Canadian Journal of Surgery*, vol. 10, Oct. 1967, pp. 431-8).
- HEIMBECKER, R. O. "Pulmonary Embolism" (editorial, *Canadian Medical Association Journal*, vol. 98, no. 2, Jan. 13, 1968, p. 111).
- HEIMBECKER, R. O., and CHEN, C. "Surgery for Acute Myocardial Infarction: An Experimental Study of Emergency Infarctectomy with a Preliminary Report on the Clinical Application" (*Circulation*, vol. 36, supp. 2, Oct. 1967, p. 138) (abstract).
- HEIMBECKER, R. O., KEON, W. J., and ELLIOTT, GEORGIA. "Pulmonary Embolectomy" (*Archives of Surgery*, vol. 95, Oct. 1967, pp. 576-84).
- HEIMBECKER, R. O., LEMIRE, G., and CHEN, C. "Surgery for Massive Myocardial Infarction: An Experimental Study of Emergency Infarctectomy with a Preliminary Report on the Clinical Application" (*Circulation*, vol. 37, supp. 2, no. 3, April 1968, p. 11).
- HORSEY, W. J., and SCHATZ, S. W. "Results of Anterior Cervical Discotomy and Fusion" (*Canadian Medical Association Journal*, vol. 97, no. 5, July 29, 1967, p. 240) (abstract).
- HOUP, J. B., and HASTINGS, D. E. "Surgery in Rheumatoid Arthritis" (*Journal of the Canadian Physiotherapy Association*, vol. 20, no. 2, April 1968, pp. 1-4).
- JACKSON, W. R. "Symposium on Athletic Injuries" (editorial, *Applied Therapeutics*, vol. 9, no. 9, Sept. 1967, p. 733).
- KEON, W. J., TRIMBLE, A. S., and BIGELOW, W. G. "Shock - A Practical Guide to Management" (*Modern Medicine (Canada)*, vol. 23, May 1968, pp. 49-52).
- KERESTECI, A. G. (with DIXON, J. M. S.) "Renal Infection with *Pasteurella multocida*" (*Canadian Medical Association Journal*, vol. 97, no. 1, July 1, 1967, pp. 28-9).
- KERR, W. K. (with BARRIE, H. J.) "The Incidence of Pathogenesis of Tuberculous Strictures of the Renal Pelvis" (*Journal of Urology*, vol. 98, Nov. 1967, pp. 584-9).
- KIM, J. P., KING, M. H., and TRIMBLE, A. S. "An *in vitro* Assessment of Aortic Insufficiency Related to Valve Size after Homograft Valve Replacement" (*Canadian Medical Association Journal*, vol. 98, no. 2, Jan. 13, 1968, p. 111).
- KING, M. H., HEIMBECKER, R. O., and TRIMBLE, A. S. "Importance of Technique in Sterilizing and Preserving Human Aortic Valves" (*Surgical Forum*, vol. 18, 1967, pp. 119-21).
- KLOTZ, P. G. "Congenital Cystic Abnormality of the Seminal Vesicle Associated with Ipsilateral Renal Agenesis: Report of a Case" (*Canadian Journal of Surgery*, vol. 10, Oct. 1967, pp. 471-3).
- LANGER, B. "Fracture-Dislocation of the Ankle with Trapped Fibula: A Report of Two Cases" (*Canadian Journal of Surgery*, vol. 10, July 1967, pp. 308-11).
- LINDSAY, W. K. "Plastic Surgery" (*Bulletin of the Hospital for Sick Children*, vol. 17, 2nd quarter, 1967, pp. 10-12).
- "Timing in Paediatric Surgery" (*ibid.*, p. 1).



- MACDONALD, J. A. "Palliative Treatment of Metastatic Carcinoma of the Liver by Hepatic Artery Infusion with 5-Fluorouracil: Report of a Case" (*Canadian Journal of Surgery*, vol. 10, April 1967, pp. 202-7).
- MACGREGOR, D. C., ALDRIDGE, H. E., LANSDOWN, E. L., and BIGELOW, W. G. "Internal Mammary Artery Implantation for the Relief of Angina Pectoris: A Follow-up Study of 77 Patients for up to 13 Years" (*Canadian Medical Association Journal*, vol. 98, no. 4, Jan. 27, 1968, pp. 194-8).
- MCDougALL, E. P. "Acute Suppurative Tenosynovitis" (*Canadian Journal of Surgery*, vol. 11, Jan. 1968, pp. 41-3).
- MCPHEDRAN, N. T., BETT, H. D., STONE, R. M., and GOLDBERG, M. "The Nature and Source of a Gastric Secretagogue" (*Archives of Surgery*, vol. 95, Oct. 1967, pp. 606-8).
- MCPHEDRAN, N. T., and PALMER, J. A. "Athletic Injuries" (special article, *Modern Medicine*, vol. 23, March 1968, pp. 41-4).
- MITCHELL, R. I., and DAVIDSON, J. K. "Heterotopic Autotransplantation of the Canine Pancreas" (*Surgery*, vol. 62, no. 3, Sept. 1967, pp. 454-61).
- MORLEY, T. P. "Aims, Constitution and Function of the Medical Staff Association of the Toronto General Hospital" (*Canadian Medical Association Journal*, vol. 98, no. 17, April 27, 1968, pp. 805-7).
- MUNRO, I. R., FARMER, A. W., CSIMA, A., and LINDSAY, W. K. "An Analysis of Burns in Children" (*Canadian Medical Association Journal*, vol. 97, no. 8, Aug. 26, 1967, pp. 459-63).
- MUSTARD, W. T., JAIN, S. C., and TRUSLER, G. A. "Pulmonary Stenosis in the First Year of Life" (*British Heart Journal*, vol. 30, no. 2, March 1968, pp. 255-7).
- MUSTARD, W. T., MOES, C. A. F., *et al.* "Complete Transposition of the Great Vessels with Anatomic Obstruction of the Outflow Tract of the Left Ventricle" (*American Journal of Cardiology*, vol. 19, no. 5, May 1967, pp. 658-70).
- PEARSON, F. G. "An Evaluation of Mediastinoscopy in the Management of Presumably Operable Bronchial Carcinoma" (*Journal of Thoracic and Cardiovascular Surgery*, vol. 55, no. 5, May 1968, pp. 617-25).
- PEARSON, F. G., HENDERSON, R. D., GROSS, A. E., GINSBERG, R. J., and STONE, R. M. "The Reconstruction of Circumferential Tracheal Defects with a Porous Prosthesis: An Experimental and Clinical Study using Heavy Marlex Mesh" (*Journal of Thoracic and Cardiovascular Surgery*, vol. 55, no. 5, May 1968, pp. 605-16).
- PEARSON, F. G., THOMPSON, D. W., and DELARUE, N. C. "Experience with the Cytologic Detection, Localization and Treatment of Radiographically Undemonstrable Bronchial Carcinoma" (*Journal of Thoracic and Cardiovascular Surgery*, vol. 54, no. 3, Sept. 1967, pp. 371-82).
- PLEWES, BURNS, and MCKEE, J. A. "Rupture of the Common Bile Duct by Blunt Trauma" (*Canadian Medical Association Journal*, vol. 98, no. 3, Jan. 20, 1968, pp. 170-1).
- ROBERTSON, D. C. "The Technique of Inferior Flap Mammoplasty" (*Plastic and Reconstructive Surgery*, vol. 40, no. 4, 1967, pp. 372-7).
- SALTER, R. B. "Congenital Dislocation of the Hip"; chapter 7 in *Modern Trends in Orthopaedics*, ed. W. D. Graham, pp. 140-71. Margate, England: Thanet Press, Butterworths, 1967.
- "Etiology, Pathogenesis and Possible Prevention of Congenital Dislocation of the Hip" (*Canadian Medical Association Journal*, vol. 98, no. 20, May 18, 1968, pp. 933-45).
- "Gait Disturbances and Limp in Childhood"; in *Ambulatory Paediatrics*, ed. Morris Green and Robert J. Haggerty, pp. 232-6. Philadelphia: W. B. Saunders, 1967.
- "The Prevention of Cubitus Varus following Supracondylar Fracture of the Humerus in Children" (*Annals of the Royal College of Physicians and Surgeons of Canada*, Jan. 1968, p. 76) (abstract).
- SALTER, R. B., GROSS, ALLAN, and HALL, J. H. "Hydrocortisone Arthropathy - An Experimental Investigation" (*Canadian Medical Association Journal*, vol. 97, no. 7, Aug. 19, 1967, pp. 374-7).
- SHEPHERD, M. P., TAMAKI, H., and MUSTARD, W. T. "Experimental Study of the Paced Denervated Diaphragmatic Pedicle Graft" (*British Journal of Surgery*, vol. 55, no. 2, Feb. 1968, pp. 91-2).
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